1964

Agricultural development at the farm and community level through reform of existential structures: two case studies in Peru

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AGRICULTURAL DEVELOPMENT AT THE FARM AND COMMUNITY LEVEL THROUGH REFORM OF EXISTENTIAL STRUCTURES: TWO CASE STUDIES IN PERU

by

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A Dissertation Submitted to the
Graduate Faculty in Partial Fulfillment of
The Requirements for the Degree of

DOCTOR OF PHILOSOPHY

Major Subject: Agricultural Economics

Approved:

Signature was redacted for privacy.

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Signature was redacted for privacy.

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Iowa State University
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Ames, Iowa

1964

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I. INTRODUCTION

Perú is a country of many contrasts, contrasts among people found on the streets, in the weather within a radius of 20 kilometers, in the geography, in the economic conditions of its population and in the levels of education. An economic study of any aspect of Perú has to take these characteristics into consideration. It would be misleading to advance generalized concepts about the country as a whole without some understanding of its heterogeneity.

Perú is classified among the countries with a per-capita national income less than US$250.00 by the United Nations (50). According to Higgins (19), underdeveloped countries are those having twenty-five percent or less of the United States' per-capita national income. Perú is an underdeveloped country according to both measures. This concept of underdevelopment is only a relative estimation of a country's economic conditions. Development is a dynamic concept and implies change toward an improvement of present conditions. Improvement implies a goal. The identification of the goals and the rate of movement towards them are two important elements of development.

Articulation of goals is difficult since preferences of all citizens living in the nation should be considered. Yet, the goals of Peruvians are extremely diverse and frequently in conflict. However, the economic development goal represents

preferences officially held by the Peruvian nation as articulated in 1) the Charter of Punta del Este (27), 2) Peru's National Plan of Economic and Social Development 1962-1971 (3), and 3) the decree establishing the National Planning Institute (34). Also officially held is the end-in-view of agricultural improvement as a major means toward economic development of the nation as stated in the above three references and emphasized in decrees establishing the Institute of Agrarian Reform and Colonization (31, 32, 33).

Since approximately 60 percent of the nation's people live and work in the agricultural sector, development of this sector is crucial in the development of Perú. This is true both in terms of agricultural productivity contribution to national development and of consumer demand generated within the agricultural sector for industrial products and services. Existing structures within agriculture are recognized as major impediments to economic development both within agriculture and within the nation.

This study inquires into conditions as found in the Sierra region where structures within agriculture appear to be inhibiting economic development, social improvement and stability of the country. It is limited to the study of two farms purposely drawn to depict conditions of relatively good and relatively poor productivity. In analyzing these two farms the study endeavors to analyze existing productivity and structures. As a result of the analysis certain

improvements in existing conditions are suggested which would contribute to economic development, social improvement and political stability.

A. Agrarian Reform and Economic Development

Economic development is a dynamic process and implies significant changes in structures as well as adjustments in allocation of resources, leading to the attainment of the ends-in-view of people. The development process may be measured in part, by the rate of growth of the gross national product (GNP) and the GNP per-capita. These indices are useful for comparative purposes in designing a plan for development. In 1962, Perú submitted a national plan for economic and social development in accordance with the Charter of Punta del Este (27). In this plan an annual gross national product rate of 5.9 percent increase was the end-in-view fixed for a ten-year period. In order to meet this growth rate, agricultural production for internal consumption should yield an annual growth of 7.7 percent and agricultural production for export should yield an annual growth of 6.6 percent. The above growth targets can be compared with growth conditions for the period 1950-1960. During this decade the annual gross national product increased 3.7 percent, agricultural production for internal consumption 1.3 percent and export agricultural production 5.8 percent. Therefore, the gap between the growth

rate objectives as stated in the ten year plan and the growth rates experienced during the 1950's, is an annual increase of 2.2 percent for the gross national product, 6.4 percent for the agricultural production for internal consumption and 0.8 percent increase for the export agricultural production. This gap must be removed if the national norm is to be achieved.

Population increased from 8,673.9 thousand people in 1950 to 11,027.0 thousand people in 1960, while national product increased from 15,148.3 million soles to 21,807.8 million. Consequently the per-capita rate of increase in GNP was 1.17 percent. The end-in-view of 5.9 percent increase in total GNP is equivalent to 2.74 increase of GNP per-capita if population continued its 3 percent rate of increase. Therefore, the gap between the end-in-view stated in the plan and the existing situation would be an increase of 1.57 percent per-capita.

While the expected growth rates within the agricultural sector might appear excessive in relation to expected growth rates of other sectors and in light of experiences in other developing nations, this study refers to these rates as a guide in illustrating both the rate of growth expected in agriculture and the magnitude of the gap to be closed between this expected growth and the rate experienced in the recent past.

Since 60 percent of the labor force is engaged in

agriculture, the development of the agricultural sector is important for the development of the country. Also, 58 percent of the total population lives in the Sierra most of whom work in agriculture. Unfortunately neither production nor contribution to GNP data are available for recent years by regions. Consequently, neither total nor per-capita GNP data can be given for the Sierra. However, the Sierra region contributes 38 percent of the national income and its per-capita income is about 70 percent that of the nation and about one-third of the per-capita income reached in the Coastal region. These data indicate the severity of under-development in the Sierra with which this study is chiefly concerned.

To attain the economic development goal, policy makers must design their policies according to a given strategy. Strategy is defined as a plan for economic development using a given stratagem or a clearly contrived scheme. According to the crieteria of certain authors including Hirschman (20) and Rostow (38), strategy varies with the present status of development. Initially, and with specified goals in mind strategy proceeds with changes in those structures which are impeding development.

In analyzing structures, we must differentiate between changes in instruments and structures. Both are considered as variables in the change process and are subject to public intervention in the interest of economic development.

Instruments are used to make small and frequent changes within and between various sectors and are within the control of administrators and managers. However, the use of instruments in changing tax rates, interest rates, capital investments and wage rates, for example, assumes that the structures have been fashioned which permit the exercise of the instruments. In more developed countries instruments constitute the main policy means used for stimulating economic development. However, in the less developed countries structures are not yet developed to provide the policy maker with the instruments which he may use in economic development. For example, the agrarian structures in the Sierra of Perú remain largely feudal in nature and have resisted change over the past four centuries. Ownership systems follow with some modifications either the structures found in the Inca empire at the time of the Spanish Conquest in the 1530's or the structures the Spanish established using the model of the feudal systems of Spain in the XVI century or some combination of both. Thus structures regulating the control and allocation of resources with a 16th century orientation are not conducive to the development of entrepreneurship and the use of modern technology required in the process of economic development of the region.

Following the United Nations reasoning, structures are defined in this report as those institutions through which group action affects individual choice and action with respect

to resource use. Through the structures individual choice and action may be liberated, expanded or restrained (42, 44).

Agrarian structures are defined by the United Nations (48) as the institutional framework of agricultural production. It includes in the first place, land tenure, the legal and customary system under which land is owned; the distribution of ownership of farm property between large estates and peasant farms or among peasant farms of various sizes; land tenancy, the system under which land is operated and its product divided between operator and owner; the organization of credit, production and marketing; the mechanism through which agriculture is financed; the burdens imposed on rural populations by governments in the form of taxation; and the services supplied by governments to rural populations, such as technical advice and educational facilities, health services, water supply and communications. Changes in structures affect essential relationships among individuals in the use of resources as well as the levels and distribution of income resulting from resource use. If these changes correct faulty and defective institutions by introducing means which help achieve the target variables, they are termed reforms in this study.

In light of existing structures and level of economic development, it would appear that reforms are required as part of the preconditions for the take-off stage of development in major parts of the agriculture sector, particularly in the

Sierra. This is the reason why the Charter of Punta del Este (27) has encouraged participating countries to plan and carry out "integral agrarian reforms" within an integrated economic development plan for the individual country.

In addition to enhancing productivity of resources and distribution of income, agrarian reforms are also expected to help maintain a minimal level of political stability which will accommodate orderly structural change leading to economic and social development. This level of political stability contrasted with stagnation constitutes one of the necessary conditions for economic development. Agrarian reform has frequently been used as an instrument of politics to satisfy the interests of a given system or a given group of people endangering the maintenance of the stability threshold. It is important to correct this tendency and to use agrarian reforms as means to improve the development of the nation and its people as a whole while maintaining that minimal level of political stability necessary for economic progress.

B. The Problem and its Setting

Economic development is conditioned by many factors retarding or accelerating its rate. Factors retarding its rate will be called failure elements and factors accelerating it will be called success elements. Failure and success elements may be found at various levels of aggregation of

policy making such as the national, regional, community and farm levels. The failure elements contribute to the problem and the success elements contribute to its solution at each aggregational level. Following is a discussion of problems at national, Sierra regional, community and farm levels.

1. Development problems at the national level

The main development problems nationally appear to consist of a) low levels of productivity, b) inadequate distribution of income, and c) political unrest.

a. Low levels of productivity Peruvians have a very low productivity. The data supporting this statement are adjusted to 1950 constant prices. Prices increased approximately 255 percent from 1950 to 1961 (Table 1) according to Wholesale Prices (30).

Gross national product (hereafter called GNP) increased from 100 to 144 between 1950 and 1960, using an index where 100 equaled 15,148.3 million soles in 1950 (Table 2). However, this increase was erratic. From 1958 to 1959, GNP decreased from an index of 135.1 to 134.3 or 1,072.3 million soles. There was another decrease in 1953-4 to an index of 116.4.

Population data from Renta Nacional (4,5) reveal that per-capita contribution to the GNP in 1950 was S/ 1,746.00, while in 1960 it was S/ 1,891.00. Annual increases of GNP

per-capita ranged from 4.6 index points during 1954 to 6.8 index points during 1955 (index number 100=1,746 soles in 1950) with an annual average increase of 5.7 index points for the two years.

b. Inadequate distribution of income Unfortunately there are no data available showing the distribution of income by sectors. However, an indication of income distribution may be obtained by examining the contribution of each sector to the GNP and by oserved ownership patterns. The highest per-capita contribution to GNP was made by finances with 34,066 soles (Table 3), while the lowest was made by agriculture with 2,944 soles. Peru's population may be divided into three main social classes; the lower, the middle, and the higher classes. These classes are divided mainly by the amount of wealth and income they possess. This is evidenced in agriculture by 1.6 percent of the farmers owning 76.2 percent of the cultivated area while 59.5 percent of the farmers own only 0.9 percent of the cultivated area (13). The average farm size of the first group is larger than one thousand hectares while the second group has an average size smaller than five hectares.

The higher class is characterized by owners of the haciendas and other wealthy people. The middle class is formed by owners of smaller farms, professional people and white collar workers. Usually the lower class people do not own any real estate. This fact is important especially if

the structure is so rigid from the social mobility point of view that few people with "humble background can expect to rise to positions of high responsibility, no matter what their efforts and ability" as pointed out by Whyte (51).

c. Political unrest The country is passing through a period of political unrest manifested in many types of actions impeding the development of the country and the work of people in agriculture and in industry. Rioters claim their unrest is due to low income and feudal land tenure practices. This is observed especially within the agricultural sector. The population of Peru is demanding reforms in order that the "oppressed people" may work on their own lands, instead of working for others at uncertain wages and below their productivity potential as will be shown later in this report.

2. Agricultural problems within the Sierra

Throughout the Sierra region with which this study is concerned, a major problem is the shortage of cultivable land. Stated conversely, there is unemployment and underemployment of people in agriculture. This contributes to a very low marginal value productivity of labor and extremely low consumption levels. Since the majority of the nation's labor force works in agriculture, this low productivity creates a negligible demand for non-agricultural products.

The situation calls for increased productivity of existing agriculture, development of more agricultural areas and for mobility of labor from agriculture to other sectors on a national development path. Feudal land tenure structures as found in the Sierra do not permit most Peruvians to accumulate capital. These structures also lead to concentration of capital. Deficient structures also encourage the non-Indian Peruvians to discriminate against the Indians. Frequently, Indians are thought to be unable to learn or to make decisions or to perform jobs other than physical labor.

The 1940 data (the most recent available data) indicate that almost 53 percent of the nation's population was white, or "mestiza", and around 47 percent was Indian (Table 4). The main criterion in classifying the population as Indian was the literacy level. Therefore, this 47 percent is an indication of the level of illiteracy of the Peruvian population.

Table 4 indicates distribution of Indian population for three important Departamentos of the South Sierra of Perú as compared with Lima which is located on the coast. In Puno, Cuzco and Ayacucho, the Indian population varies from 71 percent to 92 percent of the total, indicating that the illiteracy rate in these Departamentos is extremely high, while in Lima the Indian population is only 15 percent.

3. Agricultural problems at the community and farm level

Before discussing the problems, let us examine briefly the environments where agricultural laborers live at the community and farm levels in the Peruvian Sierra. Laborers work in haciendas or in Communidades Indigenas. Haciendas are constituted usually by land belonging to a given person or institution encompassing a community of laborers who live there and have an obligation to work for the owner during a given period as part or total payment for the land they are granted for cultivation or pasture. However, Indians are usually paid a wage, either in kind or in money, in addition to the land they cultivate or pasture. Communidades Indigenas are constituted by people living on a given area of land who have blood ties and work the land of the community as a group or individually. Some of the Communidades Indigenas are recognized by the government and given some help to keep them together as a community. This type of arrangement has been inherited from the Inca period.

These two environments can be considered communities because both are formed by groups of individuals who work and live as a group. The main problems arising within the Indian communities are especially due to the low productive lands, the small size of the units for cultivation due in part to population growth, the lack of knowledgeable leadership and management, and the lack of capital and technology. A very important problem is the existence of disguised

unemployment and redundant laborers especially due to lack of employment outside agriculture.

It is important to understand that problems in the hacienda type of holding can be divided according to level of aggregation into community and farm. The community problems refer to the problems faced by the hacienda as a whole including the owner and the Indians living on the hacienda. The farm level problems refer to the problems faced by the Indians as individuals working on the plots they are given for cultivation under feudal patterns. The problems at the farm level are acute especially because very often the lands Indians cultivate are not sufficient for feeding their families. The condition generates serious dissatisfactions among the Indians.

The instabilities and dissatisfactions of Indians working in agriculture, together with other political movements, brought about the creation of the Instituto de Reforma Agraria y Colonization (hereafter called IRAC) (32).

The government decided to create IRAC, following recommendations of the Comision de Reforma Agraria y la Vivienda. This commission was established in 1957. After four years of study, it prepared a proposed law for agrarian reform in Perú (28). The government presented this law to Congress, but it was never debated.

IRAC was created by Supreme Decree No. 9, June 3, 1960 (32). Supreme Decree No. 1, April 21, 1961 (33), extends the original provisions. Augmented by Decree Law No. 14238,

November 16, 1962 (31), IRAC is assigned broad responsibilities for development of the nation's agriculture.

In order for the Institute to work efficiently, it must acquire considerable information about the problems it seeks to remedy. Since the solution is to come, in part, through a change in agricultural and nonagricultural structures, IRAC will find it necessary to invent and adapt new structures as preconditions to the development of the country. This study exemplifies a kind of investigation needed by IRAC in identifying and remedying the problems with which the Institute is charged.

C. Objectives of this Study

The objectives of this study are as follows:

(1) To identify certain failure and success elements in the Peruvian Sierra agrarian situation primarily through a detailed study of two Sierra farms.

(2) To analyze economic results in an ex-ante framework of a change in structure within Sierra farms, as suggested by the farms studied.

(3) To design a model for the development of the agriculture at the farm and community levels with special reference to the two Sierra farms.

(4) To suggest certain changes of structure found in this study and to outline further research needs.

D. Procedures Used

A fact finding trip was undertaken through the South Sierra of Peru in order to have an over all idea of the conditions of the region. A survey of the literature and data was also undertaken and government officials were contacted to determine the problems and the scope of the study. Since we could not find a population from which to draw a sample, the case study approach was selected. Possible areas of study were selected taking into consideration density of population, income of the people, physical characteristics of the region, and other relevant factors. Two haciendas were selected from the continium found in order to depict a highly productive Sierra hacienda and an unproductive hacienda. A survey of the Distrito where the haciendas were located was undertaken to compare the conditions of the selected haciendas in relation to the other Distrito's haciendas.

The Cuzco hacienda is divided into two main section which will be called the core hacienda and the annex. Each of the sections constitutes a different community. Both the core hacienda and the annex laborers are given plots of land for cultivation and pasture by the owner of the Cuzco hacienda. In return they work on the owner's lands. The study of this hacienda includes the study of the hacienda as a whole which is considered as two communities governed

by the owner and the study of the individual Indians at the farm level to estimate their income, forms of cultivation and the structures regulating their work and productivity.

The Ayacucho Farm constitutes only one community governed mainly by Indian authorities under the control of the owner who is an absentee owner. The Ayacucho hacienda represents one of the less developed agricultural areas in the region with methods of cultivation being poor and obsolete.

The study of the two farms is guided by a policy making model developed with the idea of providing a methodology to the study of structures found at the farm and community levels. One important characteristic of this model is its double level of aggregation. The model is first developed at the farm level by the study of the structural relationships of exogenous variables to attain given target variables. The same scheme is developed for the community level. There is a link among the levels through the exogenous variables. Some of these variables are not policy means at farm level; however, they become policy means at the community level. Other levels of aggregation beyond the community were not studied, but there is no reason why a comprehensive study from the farm through the regional and national levels may not be pursued.

E. Plan of this Report

Following this initial section, the next or second section elaborates a model for the development of agriculture at the farm and community levels. The third section continues with case studies of the two farms in the Andean region of Peru. The fourth section proceeds to explore the possibilities of reform of structures found in the two farms at both farm and community levels. The fifth section summarizes the report and suggests areas of research for future studies.

Additional data to support the statements in the text are presented in the appendix.

II. A MODEL FOR THE DEVELOPMENT OF AGRICULTURE AT THE FARM AND COMMUNITY LEVELS

This section develops a policy making model[1] which could be used by researchers concerned with economic development at various levels of aggregation. It is assumed that research would be carried out with the objective of estimating the consequences of the application of certain policy means under given circumstances. The model is adapted to the conditions found in the Sierra region and applied in the analysis of two haciendas, the Ayacucho and the Cuzco haciendas.

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[1] Professor Tinbergen (48) defines economic policy as follows:

> By "economic policy" certain acts of economic behavior are indicated. In its broadest sense therefore the phrase includes the whole subject matter of economic theory. This is particularly true with regard to the "economic policy" of individuals or individual firms. This economic policy is directed towards the maximization of the ordinary ophelimity functions. In a narrower sense we may restrict the meaning of the term "economic policy" to the behavior of organized groups, such as trade unions, agricultural or industrial organizations, etc. Here some collective ophelimity function will be the object to be maximized. In its most specific and most relevant sense the notion of economic policy will, however, refer to governments.

In this study the term economic policy will be used in both its broadest and narrower meanings according to Professor Tinbergen, since it is applied to the farm and community level. However, it is important to remember that the community level policy maker is a form of government and could be formalized as such. The various levels of aggregation would not change the principles of the theory of economic policy, they would merely change the preference function and the variables the policy maker is faced with.

A. Policy-making Model Applied to the Sierra Region

In a recent article, Johnston and Mellor (21) divide agricultural development into three phases: Phase I, development of agricultural preconditions; phase II, expansion of agricultural production based on labor-intensive, capital saving techniques, relying heavily on technological innovations; phase III, expansion of agricultural production based on capital-intensive, labor-saving techniques. Peru can be classified as being in phase I, where pre-conditions are needed for development. Johnston and Mellor explain briefly the policies needed to provide these pre-conditions with a special emphasis on land tenure reforms.

The articles of Lewis (24) (25), dividing the economy into two-sector models, followed by an article by Ranis and Fei (37), provide a framework within which the transition from stagnation to self-sustaining growth based especially on the agricultural productivity and supply can be analyzed.

All these attempts to construct an economic development theory for the agricultural sector of an underdeveloped country are mainly from a theoretical economic point of view. However, Thorbecke (41), attempts to relate the economic development to the theory or economic policy in order to analyze agrarian reforms as means toward economic development. He bases his economic policy theory

on Tinbergen's approach (47) (48), who divided the analysis into three elements: 1) welfare function, 2) variables, and 3) specification of a system of structural relationships.

The model presented in this section will follow these guides with certain modifications. It will be divided into two policy-making levels. Within each level special attention is given the preference function and the variables. The model encompasses structural relationships of variables within and between policy making levels.

1. Policy-making levels

Both farm and community policy-making levels are included in the model. As applied to Sierra conditions the farm level refers to land operated by individuals, mostly Indians drawing income from farming it for themselves regardless of the ownership of land resources. As an example of farm level we may consider the plots of land farmed by Indians and given to them for cultivation as part payment for work performed at the Ayacucho hacienda as will be analyzed later. The community level constitutes a group of farmers or household units established in a territory and interrelated in such a way, as a unit, that they can influence the economic activities as well as the legal relationships of each farmer or household. Through its policy maker the community exerts a unifying effect upon the members and fulfills the functions of social life on its own or in

connection with more complex groups.

At each of the policy-making levels discussed above, and with a given planning horizon, the policy maker formulates a preference or welfare function according to preferences he may have with respect to the elements determining the individual welfare, the relationships among individuals and other factors that he considers of value. This is different for each level of aggregation; however, it will be influenced by the preference or welfare function of policy makers at other levels. It may be that the best allocation of resources for a group of farms is not the best for an individual entrepreneur within that group, or, at a higher level of aggregation. What is good for the nation may not be best for the group of farms. It is very important to make a decision concerning the level of aggregation and the level of complementarity and competitiveness of the resources at each level. As stated by Timmons (45),

> Intrafirm and Interfirm problems of land use involve elements of conflict between public and private objectives. There is an urgent need for defining the complementarity and competitive ranges of such interest.

An attempt is made here to differentiate farm and community levels so that complementarity and competitive ranges of interest may be evaluated in terms of the objectives of each aggregational policy-making level.

2. Variables

In order to make their decisions, policy makers are concerned with the variables found in the economic and social system. Variables within each level of aggregation may be classified into exogenous and endogenous. The exogenous variables or data are the determinants of the endogenous variables through the working of the economic system. The exogenous would correspond to the independent variables and the endogenous to the dependent variables in regression analysis, as stated by Fox (14). Exogenous variables may be classified as non-controllable variables or controllable variables used as policy means. The endogenous variables are classified in terms of side effects and target variables.

The policy maker does not have any influence over the non-controllable variables so that he uses the policy means in order to induce the target variables toward his preference function. If the variables are examined at the farm and community level we would observe that some of the non-controllable variables at the farm level become policy means for the community policy maker because he is in control of more factors than the farmer. Also, some of the irrelevant variables at the farm level may become target variables at the community level (Figure 1).

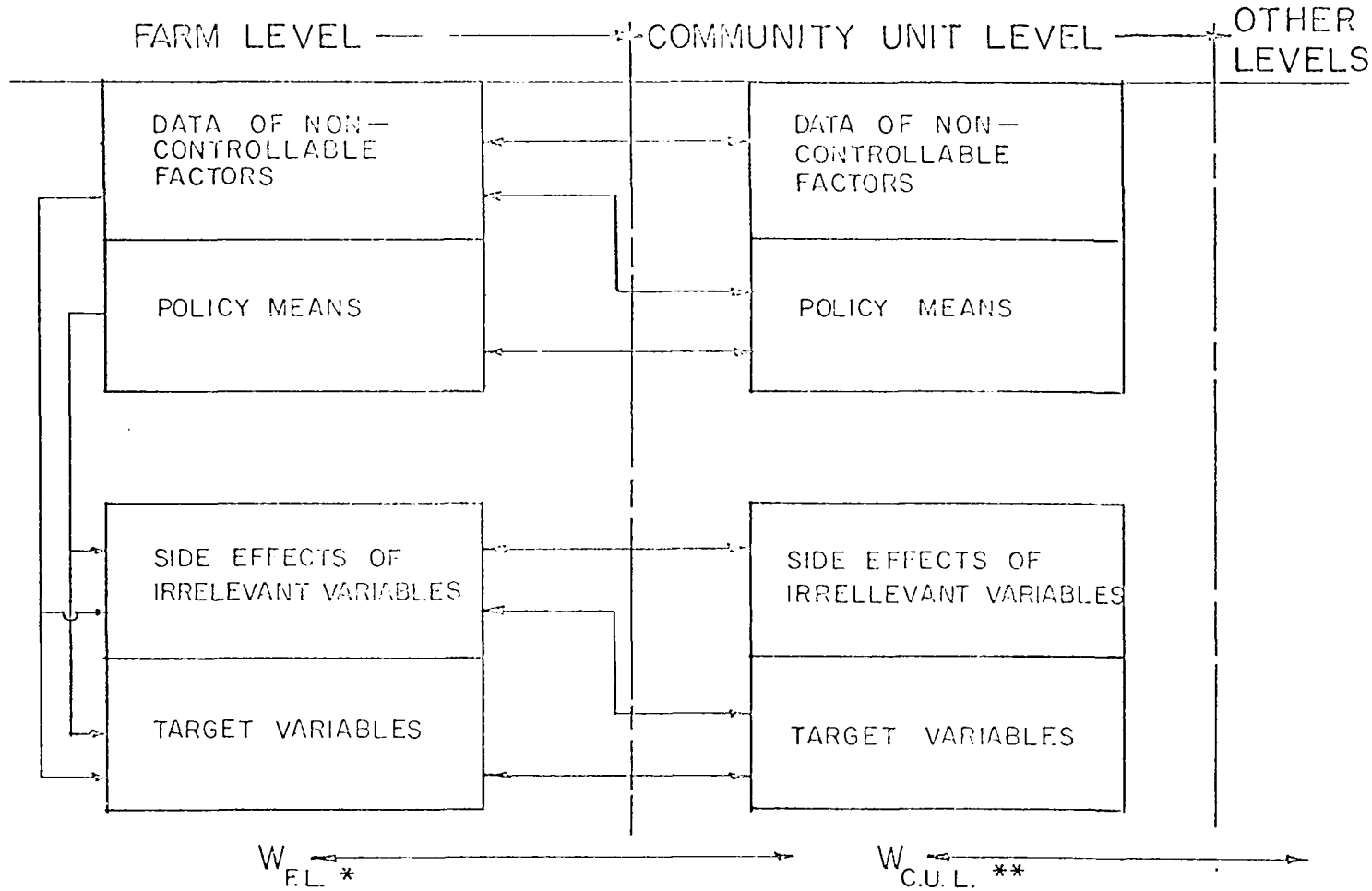

Figure 1. Theoretical relationship of policy-making within and between policy-making levels

* Farm level.
** Community unit level

3. Identification and Classification of Variables

A classification of variables adapted to the conditions found in the Sierra is developed which would serve the purpose of establishing the status of farmers and communities as well as of establishing a model for the attainment of the policy makers welfare function through a system of structural relationships linking variables.

The classification may be applied either to the farm or to the community level of policy-making. It is assumed that the policy maker at the farm level is the head of a household as operator of a plot of land, as a wage earner or as an unemployed individual. The policy maker at the community level could be an individual or a council (elected or imposed by the structural system) who makes and enforces on the members the rules guiding their lives in common. The policy maker will select from the exogenous variables his policy means to drive the target variables toward his welfare function.

a. Exogenous variables Exogenous variables will be studied in the following order: 1) resources, 2) products or activities, 3) variables affecting physical productivity of resources, 4) variables affecting price of resources, and 5), variables generated in other policy-making levels.

(1) Resources The first general subdivision of resources will be according to ownership or property.

The policy maker will be interested in knowing the amount of resources he owns in relation to the amount of resources owned by others. Ownership will also be a factor in defining the policy-making unit.

Following is a discussion of the implications of ownership. Property is the right to control, use, lease, and dispose of an economic good or service subject to the limitations established by laws and regulations. Property, by class of owners, may be classified as : 1) private-where a private person, either natural or artificial, is vested with the right to an economic good; 2) public-when formally organized government units like cities, districts, municipalities, or other governmental institutions are vested with the right to control the economic good; and 3) group-where an association of individuals or a community or other group of individuals bound together with a common loyalty or interest are vested with the right to control the economic good.

Owned and non-owned resources may be classified as land resources, capital resources, labor resources and entrepreneuship. Each of these categories may be classified according to kind of resources and availability level.

The kind of land resources are classified according to soil and other ratings. Soil can be classified by its productivity capacity. The basic principles of this classification are summarized following some of the norms used by

Servicio Cooperativo Interamericano de Fomento (36). Soil is classified in two main groups: Land for cultivation and other uses, and land with limitations in use, generally not suited for cultivation but good for permanent crops. Within these two groups there are four classes each or a total of eight. These classes are numbered according to their use limitations. Class I embodies lands with virtually no limitations in potential use, while Class VIII lands have many limitations in potential use.

This classification is coupled to another rating according to the following characteristics: Factor A rating, according to the physical characteristics of the surface; factor B rating, according to the surface texture; factor C rating, based on slope; factor X rating, based on other conditions such as drainage, alkali, fertility, erosion, microrelief; and factor Z rating, based on climate. These ratings are expressed in percentages. Their combined value is obtained by multiplying the factors.

The grouping of land according to its use capacity is presented as follows:

Land Rating	Classes of Use Capacity
90 - 100%	I
76 - 89%	II
65 - 75%	III
53 - 54%	IV
41 - 52%	V
29 - 40%	VI
9 - 28%	VII
0 - 8%	VIII

The criticism of this rating schedule from an economic point of view is that the interrelationships of the factors described might be altered if they are in a given combination. The straight multiplication of percentages will not give the correct characteristics of the land and land resources. However, it is the most advanced classification found and will be adopted for purposes of land classification by type.

The kind of capital resources will vary according to objectives of resources, mobility, etc. Subclassifications can be worked out for each type of agricultural operation and for each region. Also, the availability of each kind of capital resources is important to determine its importance in production.

The kind of entrepreneurship could be measured by level of education, by relationship to the policy-making unit, and by relationships to other policy-making levels. The kind of labor could be classified into operator or non-operator. The operator could be a private individual or a group of people bound together by blood or by a political or institutional arrangement. We would also have a subclassification according to the type of labor in relation with the demands for various kinds of jobs and the training required.

(2) Products or activities The main distinction we will make among activities is to classify them as a) direct productive activities and b) social overhead

capital. The reason for this distinction is mainly that social overhead capital's returns cannot be evaluated through the sale of a tangible product. This is because the product resulting from social overhead capital would have to be evaluated through the returns obtained from directly productive activities immediately or over a long period.

Direct productive activities could be subclassified in various forms according to the various goals of the farmer or according to the range of activities to be found in the region: for example, agricultural activities, livestock activities, transformation activities. The social overhead capital could be divided according to the purpose and levels of aggregation: for example, education, land improvement, transportation, health improvement, housing, etc. Each group could be subdivided into farm, community, regionally or nationally provided social overhead capital.

(3) Variables affecting physical productivity Technology, incentives, motivations and structures may affect physical productivity originating a variation of the input-output coefficients. Technological level may be a function of the knowledge of the entrepreneur and it could be considered under entrepreneurship. However, new technology could be foreign to the entrepreneur and it could be brought from the outside by introducing changes in resources developed outside the farm. Incentives and motivations would mainly

affect productivity of labor resources but through these changes they may also alter productivity of other resources. Structures other than ownership may also have influence on marginal physical productivity.

(4) Variables affecting prices Prices may be altered by physical, economic and institutional variables. Under physical variables we may include locational attributes, communications and transportation. Economic variables include elasticities and quantities of factors supplied and elasticities and quantities of products and services demanded. The institutional variables would include mainly such factors as price ceilings or price support programs by government agencies.

(5) Variables generated in other policy-making levels There are some variables affecting the policy-making unit which may be based on the following considerations. The individual may use his property as he wants until his private rights are in conflict with the interest of this community. If the interest of a private individual conflict with the normal development of the community affecting the activities of the community people, then community interest may prevail and one or more of the powers of the state may operate to improve the situation.

The government can exercise formal controls like eminent domain, police power and taxation to improve the situation when there is conflict between individuals and the public interest. Police power is the right of the government to

regulate the use of property in the interest of public health, safety, morals, and general welfare, without payment compensation. It includes zoning, land regulation and agricultural production controls. Power of taxation provides the means by which government collects the major portion of revenues to finance its operations. Eminent domain is the power to take private property for public use upon payment of just compensation. Government can also exercise some other informal controls like the spending power or the expenditure of public funds for the public welfare. These may be in the form of grants, loans, investments and other kinds of financial aid, but always in the interest of public welfare. The proprietary power to own property and to produce and market the products in competition with private enterprise is also a governmental tool.

b. Endogenous variables Endogenous variables can be classified into 1) levels of productivity and income attained by various levels of aggregation including farmer, his community, his region, his nation or even a group of nations, 2) level of employment in relation to labor, land resources and capital resources also at the various aggregational levels, and 3) opportunities for farmer, his community, his region, his country, or a group of countries.

4. Summary of the Classification of Variables

Exogenous variables may be classified as:

I. Resources

A. Ownership

1. Owned by the policy maker
   a. Private
   b. Group
   c. Public

2. Non-owned by the policy maker
   a. Private
   b. Group
   c. Public

B. Class of resources

1. Land and land resources
   a. Kind: I, II, III,...,VIII
   b. Availability levels

2. Capital resources
   a. Kind
   b. Availability levels

3. Entrepreneurship
   a. Kind
   b. Availability levels

4. Labor
   a. Kind
   b. Availability levels

II. Products or Activities

A. Direct productive activities

B. Social overhead capital

III. Variables affecting physical productivity or resources

A. Technology

B. Incentives and motivations

C. Structures

IV. Variables affecting prices

A. Physical variables
1. Location attributes
2. Communications
3. Transportation

B. Economic variables
1. Supply variables
a. Elasticities
b. Quantities

2. Demand variables
a. Elasticities
b. Quantities

C. Institutional variables

V. Variables generated in other policy-making levels

A. Taxation

B. Eminent domain

C. Police power

D. Spending power

E. Proprietary power

Endogenous variables may be classified as:

I. Levels of productivity and income

II. Levels of employment

III. Opportunities for employment.

5. Policy-making model at the farm level

The model consists of the relations among variables in order to attain a certain preference function. At the farm level the policy maker is the farmer himself and he would select his target variable. It is assumed that his target

variables are levels of productivity and income of his farm operation. The other endogenous variables would be considered side effects by him.

He would try to bring his target variables closer to his preference or welfare function. He will determine a given end-in-view or attainable objective to push his target variables towards it. The concept of end-in-view is well stated on Dewey's work (11) and also in Gittinger (17) as an intermediate workable objective in a chain of end-in-view directed toward higher objectives.

a. Theoretical model The relationships of the variables will express the main elements conditioning productivity and income of the farmer. These elements are the data a farmer will be faced with. An economic analysis designed to solve the problem of achieving the ends-in-view would start by formulating a model and then gathering the information required to proceed with the estimation. The model could be a linear programming model and it could be stated as follows:

The farmer would maximize a profit function

$$c_1x_1 + c_2x_2 + c_3x_3 + \ldots\ldots + c_nx_n$$

where

n=number of commodities or activities used in his farm.

x_j=amount produced of the jth commodity. This would mean that he is producing n different commodities i.e. wheat, corn, potatoes, etc.

c_j=profit per unit of commodity j or

$c_j=p_j-(p^1ij+p_2j+..+p^1mj)$

p_j=price of the products

p^1ij=price of the resources

m=number of resources

The above functions would be subject to the conditions:

$$x_1 \geq o,\ x_2 \geq o, \ldots\ldots x_n \geq o$$

and

$$a_{11}x_1+a_{12}x+\ldots\ldots+a_{1n}x_n-b_1$$

$$a_{21}x_1+a_{22}x_2+\ldots\ldots+a_{2n}x_n-b_2$$

$$a_{m1}x_1+a_{m2}x_2+\ldots\ldots+a_{mn}x_n-bm$$

where

a_{ij}=amount of resource i required to produce one unit of commodity j.

b_i =availability of resource i by units

However, this model presents several weaknesses if we analyze farmer's productivity and income from a structural as well as a developmental point of view. The origin of the weaknesses could be studied at three main levels: the profit function, the coefficients a_{ij} and the coefficients b_i.

(1) <u>The profit function</u> The profit function as stated above only reflects the total profit for the farm unit and it does not give any consideration to the ownership of resources used for the production of x_j. If resources were furnished by different persons, the rewards to these have

to be allocated to the owners in order to avoid conflicts, dissociations[1] and inefficiencies. Therefore, the coefficients $c_j=p_j-(p^1_1j+p^1_2j+.....+p^1mj)$ would have to be divided among the owners of resources giving origin to various profit functions (arranged in various rows). Each row would have coefficient c_j's representing profits allocated to a given owner. A model like this has been presented by Benedictis and Timmons (6) including a similar division of the various resource coefficients a_{ij} among the corresponding owners or suppliers of resources.

The farmer (policy maker at the farm level) would be only interested in maximizing the profit function of the row containing the c_j coefficients belonging to him, since the other profit functions would have to be allocated to the other owners of resources.

In addition to the ownership factor discussed above the c_j coefficients may vary. The origin of the variation may be twofold, changes in p_j=price of the product and changes in $(p^1_1j+p^1_2j+.....+p^1_mj)$=price of resources. The farmer will be interested in maximizing pj and minimizing p^1_1j of the resources he owns. Factors influencing price levels are supply and demand functions (elasticity and quantities), degrees of market imperfections, locational attributes,

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[1]For explanation of the term and further elaboration see Timmons (43)

communication, institutional factors like marketing channels, systems of marketing operations, classification.

The above considerations show that prices are a function of many variables which affect their level. Some of these factors may be changed by the policy maker (farmer) while some of them may not be under his control. He will be interested in the study of factors under his control with the purpose of maximizing c_j's and he will also be interested in estimating the level of price fluctuation in order to determine the desirability of introducing a parameter (21) in his profit maximizing model.

(2) The coefficients a_{ij} The a_{ij} coefficients are considered as point estimates of the production functions of the various resources included in the model. As stated earlier, the linear programming model considers them as fixed coefficients not subject to variation. However, this should not be the case under the assumptions we are using.

As developed in the Benedictis and Timmons model (6), it becomes important to make a distinction of a_{ij} coefficients according to ownership. The reason for this distinction is that the a_{ij} coefficients would show the productivity of resources which is used to determine their corresponding rewards. The farmer would be interested mainly in estimating the productivity levels of the resources he owns.

But, the above adjustment still consider a_{ij} coefficients

as fixed. The farmer would be interested in analyzing the factors which cause the variation in the a_{ij} coefficients as fixed. The farmer would be interested in analyzing the factors which cause the variation in the a_{ij} coefficients. He may start by investigating which is the effect of the resources he does not own upon the other resources because the above discussion implies that only owned resources would give him some reward. However, this is not true because the addition of non-owned resources into his operation could have the effect of affecting the a_{ij} coefficients of owned resources through complementarity. This implies that non-owned resources may have an indirect effect on farmer's profit maximization by causing a_{ij} coefficients to change.

The a_{ij} coefficients may also be improved by the application of better technology, efficiency of use and also, especially in the case of labor by such motivational factors as enjoyment of work and incentives to increase their willingness to work.

The above discussion shows that the assumption of fixed coefficients is a strong weakness of the linear programming model since a_{ij} coefficients may be a function of the level of application of other resources, technology, psycological and institutional factors.

(3) The b_i coefficients The availability of resources is one of the linear programming restrictions and it also considers them as fixed. However, parametric

linear programming models allow for variations on the levels of b_i coefficients. Variables b_1 coefficients are also to be considered by farmers as important data for income maximization.

The purpose of the above discussion was mainly to identify some of the factors farmers ought to consider in order to attain their target variables. Linear programming must be further developed theoretically to handle some of the weaknesses outlined above. However, this is beyond the scope of this study.

In addition to the above factors considered within the framework of the model there are other factors outside the model which are of importance to farmers and they may influence indirectly his income. These factors are cost of fixed factors and also influence of other policy-making levels through the powers they are given by society.

b. Structural relationships of policy means From the exogenous variables and the theoretical model discussed in the preceding section some policy means can be selected by the farmer to attain the target variables. But a great many of them may be considered as "other data" not subject to change by an action farmer.

Figure 2 illustrates the interrelationships of some assumed policy means in order to push the target variables towards the ends-in-view. The first policy means we will consider here will be productivity of the operator (III).

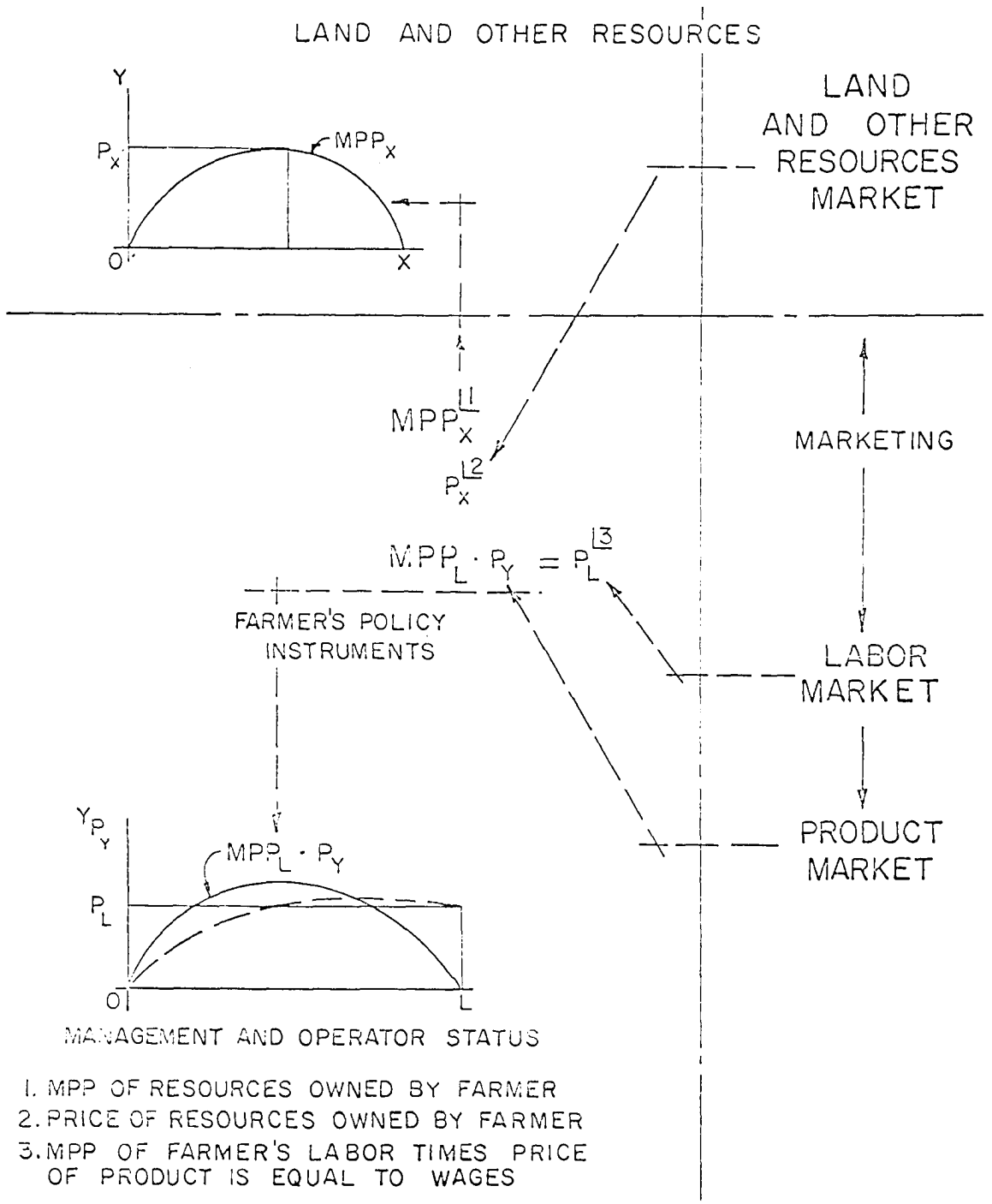

Figure 2. Structural relationships of policy means at the farm level

A hypothetical example will help us identify a strategy. Let us assume that the operator is producing a given crop, i.e., wheat. The market price of wheat is given and stable. Let us also assume that one laborer, the operator, is responsible for the production of this crop. The type of work he performs is always the same no matter how many hours he works in the production of this crop. The number of hours of labor is the independent variable; production is the dependent variable. Under these circumstances we can draw a hypothetical marginal productivity curve (MVP_1) (Figure 3).

The marginal value product (MVP_1) is the change in production times price of the product when the number of labor hours is varied. As the labor hours increase, the MVP_1 curve increases first and then decreases.

The best levels of production are attained when MVP_1= MC, and perfect competition is assumed. The straight line, AC, represents MC = 3. Under these conditions, the number of labor hours which maximizes profits from the production of wheat by the use of labor is OB = $5\frac{1}{2}$ hours.

As the number of hours of labor increases, MC according to productivity would decrease; at point G, MC is zero. This happens at the maximum total production obtainable from the increase in labor inputs.

Let us now assume that by investment in the purchase of water, the farmer can achieve higher crop yields through

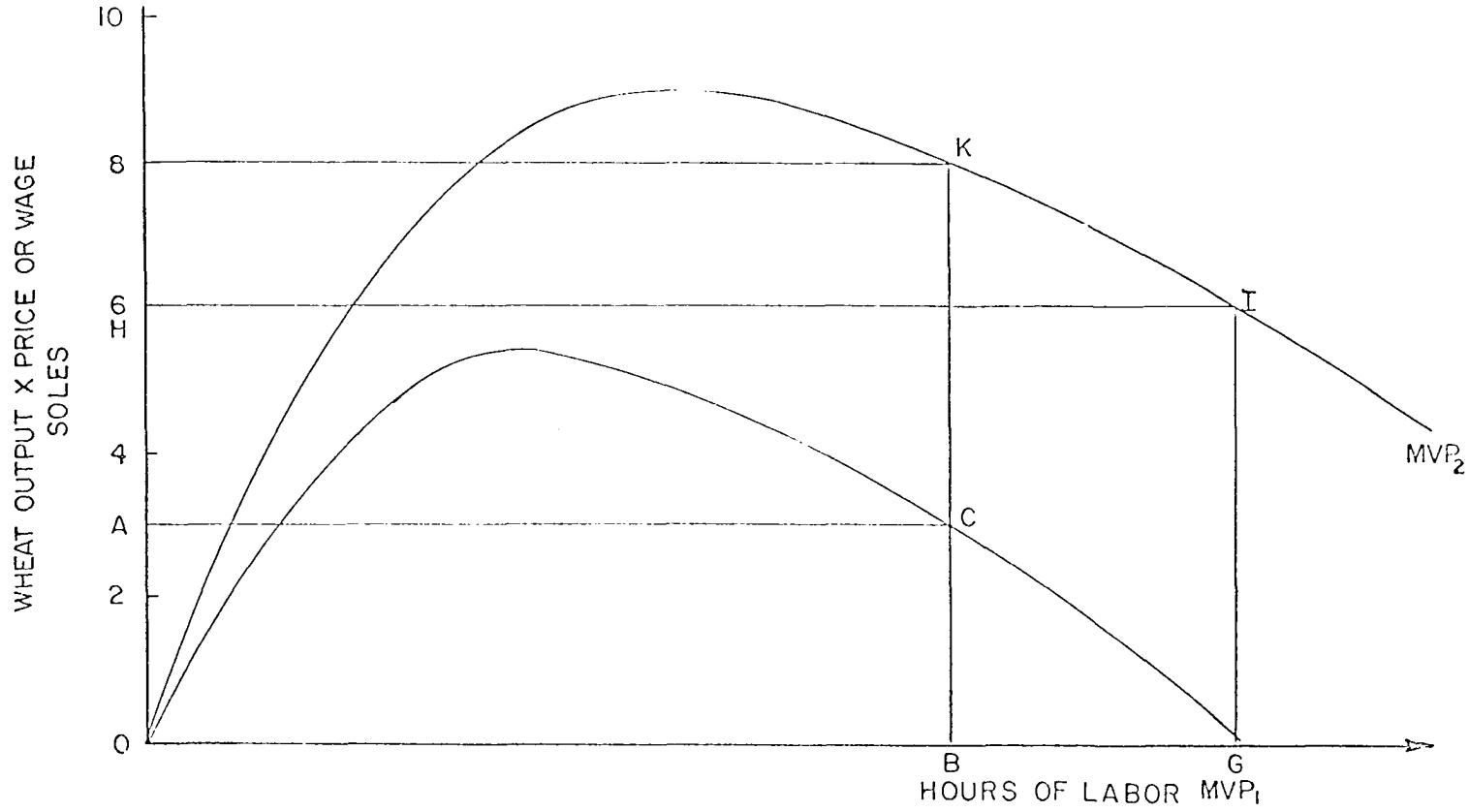

Figure 3. Marginal value product of labor increase

irrigation. The result would be an increase in the marginal productivity of labor as a consequence of an increase in production. Marginal value product after irrigation (MVP_2) would become six at OG = $7\frac{1}{2}$ hours of labor, where MVP_1 was zero before irrigation. Irrigation creates a capability to absorb more labor in order to cultivate wheat. Labor which used to be redundant with a zero MVP now becomes more productive. The total maximum production shits to the right and MVP_2 becomes six (Figure 3). This means that if we want to increase the marginal productivity of labor, we can do it by capitalization works, maintaining the same level of labor input. Laborers work equally hard in both cases. However, after the irrigation, laborers receive more MVP from their work, because of the application of more input units (i.e., water) to the fixed factor (a plot of land).

Instead of cultivating wheat, sugar cane could be cultivated. This crop requires a greater amount of labor than wheat. Therefore, labor productivity is greater at OG = $7\frac{1}{2}$ hours of labor. This case might also be represented by Figure 3. MVP_1 is the marginal value product when wheat is planted, and MVP_2 is the marginal value product when sugar cane is planted. The productivity of labor increases from zero at G, to six at IG. Figure 3 also illustrates the effects of an improvement in the type of work the laborer performs because of better education or technical assistance.

Therefore, the policy mean under discussion (III) improves the value productivity of the operator. In a systematic way, the factors influencing the increase in marginal value productivity may be summarized as follows: 1) complementary increases in MVP through the use of a greater number of units of variable inputs on the fixed amount of land. The inputs preferred should be those having higher marginal value productivity, i.e., an increase in capital to shift from labor intensive to capital intensive methods of production, provided the market for outputs and inputs is perfect. 2) Increase in the marginal value productivity of labor by the use of more productive crops, i.e., crops with higher yields and prices, with higher capacity of labor absorption. 3) Increasing knowledge and education of the operator, i.e., improvement of the kind and/or quality of job the operator is able to perform in the same number of hours of work. 4) Willingness of the laborers to work harder and better. This is due to many factors, such as their reaction to the type of work they are performing, likes and dislikes of work, degree of risk or insurance of return, and knowledge that they will be paid justly for their labor. All of this is classified under incentives for work.

The second policy mean to be studied is the amount of resources owned (A. I.). The resources owned, which are used in the production process, contribute to the earnings of

the owner with the rewards for his participation in the production process. If the resources are paid according to productivity their reward would be equal to their marginal value product. Therefore, the farmer should try to own capital resources with the higher marginal value productivity. Capital resources are scarce under the present conditions: their marginal productivity is likely to be high; therefore, the owner is likely to obtain a high reward from these resources. The way to increase capital resources from the farmer point of view is to invest his earnings on more productive resources and not on consumption. He should restrict the expenditures in consumption to the minimum. The savings made should then be invested in the most productive capital resources. If the farmer is interested only in his farm, resources ought to be provided unto the point where:

$$py \cdot \frac{MPPl}{pl} - py \cdot \frac{MPPc}{pc} - py \cdot \frac{MPPo}{po} - py \cdot \frac{MPPm}{pm} - 1.o$$

where py = price of the product; MPPl, MPPc, MPPo, and MPPm are the marginal physical product of labor, capital, land and management, while pl, pc, po and pm are the prices of these factors. If the MVP of one resource is higher than the MVP of another it should be increased until the MVP's become equal. Another alternative of the farmer is to study the market of capital resources and invest his money in resources with higher MVP, even outside the farm. However, this is not usually possible under the present

conditions; the earnings of laborers are very small because of the lack of use of capital resources in the farm production; thus the farmers' productivity is below or equal to subsistence. They need the help of other policy-making units, especially because of the lack in availability of credit, liquidity and rigidities in farm size and tenure structures.

Wages (price of labor) are the third policy means to be taken into consideration here. Wages of labor are determined by the supply and demand of labor. If the supply is large, the wages tend to decrease; therefore, the marginal value product curve would also be depressed, because labor would tend to decrease productivity to adjust to wages. The reverse would happen if the supply is low. The labor demand is given by the needs of labor in the market. If labor intensive methods are adopted in new industries, the demand for labor would be great and the marginal value product would tend to decrease. If capital intensive methods are adopted, wages would go down and the marginal value product of labor would also be depressed.

Variables affecting product markets will also have influence on the productivity and earnings of the farmer. The optimum use of labor units is determined by the marginal value product curve and by the price of the product in the market. If the market is small and many farmers increase their production, the market will be affected; the increased

supply of the product will contribute to decrease the price of the product if the demand remains constant. The marginal value productivity of labor will decrease, causing an increase in the number of units of labor which will be needed for optimizing production. In other words, the amount of land cultivated by each person will be smaller. The control of these marketing forces is not under the control of the farmer unless he could sell in different markets and store his products. He would need the help of other policy-making units in these endeavors, especially in providing the roads to accessibility of and information about other markets.

6. Policy-making Model at the Community Level

The policy means at the community level will cover some of the elements which were considered non-controllable variables by the individual farmers. The ability of the individual farmers to combine their policy means for the attainment of their target variables will have an influence on the strategy used by the community council in combining policy means at the community unit level. If the farmers are not able to meet the target variables of the community council, then the council should act, supplementing the policy means of the farmers.

It is assumed that the council of the community has

the following target variables: I, levels of income and productivity of the community; II., levels of employment at the community; and III., opportunity of all members of the community. The exogenous variables faced by the community council are different from the farmer's because of the effects of aggregation, however, they may be classified in the same way as in the case of the farm. The theoretical model for analysis would change however. This change is mainly due to considerations about the policy maker, and considerations about the target variables.

The policy maker's range of choice is important at this level because at the farmer's level the assumption was made that he would work toward improvement of his conditions through increase in productivity and income. However, at the community level the policy maker could design policies which would be in opposition to the desires of the majority. Therefore, consideration needs to be given to the conflicts which may arise between farmers and community policy maker.

The fact that at the community level the farmer is not working exclusively toward his interests may necessitate a change from the assumed target variable of profit maximization to a composite one which may include the same element of profit maximization but coupled with a distributive element of provision of employment opportunities to all the members of the community. Under these circumstances the

theoretical model presented at the farm level might not serve the purpose. As will be shown later the community level serves a definite purpose for the group's productivity that, if not existent, would cause maladjustments and dissociations within the group lessening the possibilities of improvement of individual farmers.

Proceeding with the model at the community level, we will first appraise the influence the community council on individual productivity. Then, after estimating this influence, we will estimate the needs of the people belonging to community in order to design the strategy for the use of policy means.

a. Influence on individual farm productivity

Following Georgescu-Roegen's (15) paper on lexicographic ordering, we intend to show that laborers producing at subsistence may prefer to have certain freedom of economic decision curtailed as long as they receive commensurate increases in income to feed their families. Under this concept individual wants are varied and different in kind, so we cannot mix them together in a single utility concept. As an example of this, we quote Georgescu-Roegen (15):

> In any American household water is consumed to the satiety of thirst - therefore, should have a zero intensity of utility at that point - while, since water is not used to satiety in sprinkling the lawn, it must have a positive final degree of utility. Yet, no household would go thirsty - no matter how little - in order to water a flower pot.

In this quotation Georgescu-Roegen is explaining that

if several wants are satisfied by a commodity, the marginal utility with respect to some wants could be zero, because these wants are completely satisfied; but the utility of the last unit could be more than zero, because it is related to other wants.

On the basis of this reasoning, we cannot use the marginal utility theory in the analysis unless it satisfies only wants of equal importance and no others. The principle discussed here becomes more complicated because there is no one-to-one correspondence between wants and goods. Usually, not a single good but a quantity of goods stands opposite not a single complete need but a complex of such needs. There is a pattern of wants as follows:

1) The hierarchy of wants seems to be for all men identical up to a certain rank, i.e., thirst, hunger, shelter, leisure; 2) individuals belonging to the same culture are likely to have in common a still greater number of wants at the top of the hierarchy than those common to all men. As a result of these, utility of purchasing power is greater for the poor than for the rich. The discussion of wants up to now helps us to understand their nature.

We now have a more definite idea of what we are dealing with when we mention "the satisfaction of wants". We will next turn to the theory of how people make their choices in order to get the maximum satisfaction of their wants. By maximum satisfaction of wants, we mean the satisfaction of

the greatest number and extent of wants, starting with the most important. Between two combinations of goods, the choice is made according to the lowest relevant want that can be reflected in any of the two combinations.

We will use an example to bring our analysis into this frame of reference. The following assumptions will be necessary:

Assumption 1. A given production could be obtained from two different types of institutions on which the farm could be arranged. We will call the production obtained from each arrangement, 1) product obtained from private ownership of resources control and, 2) product obtained from public ownership of resources, for example.

Assumption 2. We have three wants: a) The first one termed s is a basic want and consists of the desire for a good or the production of enough product to obtain income for a good need for subsistence. b) The second want is called f (lower than s) and consists of individual freedom. The products of institutional arrangements 1 and 2 can both satisfy the basic want s and compete with each other in the satisfaction of s. So, we can say $s = x1 + x2$. c) The third want is a lower want consists of desire to satisfy others outside the farm and it will depend on the number of people who prefer x2 and the number who prefer x1, so $e = ax1 + bx2$.

Assumption 3. Want s can only be satisfied by the

product of institutional arrangement 2. So, s = x2.

Assumption 4. There is a level s in which the want s is completely satisfied.

Assumption 5. We are to decide and make a choice among two alternative institutional arrangements.

Alternative one will be represented by C' (x1' + x2). Public and private ownership of resources are combined in such a way that we are able to combine x1' of X1 (private ownership) and x2' of X2 (public ownership). In the same way alternative two will be represented by C''(x1'' + x2'').

Assumption 6. The time period of producing X1 and X2 is the same. Some convex curves -- pseudo-indifference curves, which Georgescu-Roegen calls, as Little (26) does, behavior curves -- will be used to illustrate the example. (Figure 4). These are not indifference curves. Any point above these curves is preferred to any point on the curves and a point on the curve is in turn preferred to any point below it. This property of the present behavior curves is also shared by the indifference curves. The difference between both is that any point on the behavior line could be preferred to another point in the same curve.

The want s originates a family of behavior curves: SS, s's', s'', ps'', etc. The SS curve represents the level at which s is completely satisfied.

We introduce another family of behavior curves: ff, f'f', f''f'', etc. This family is originated by the

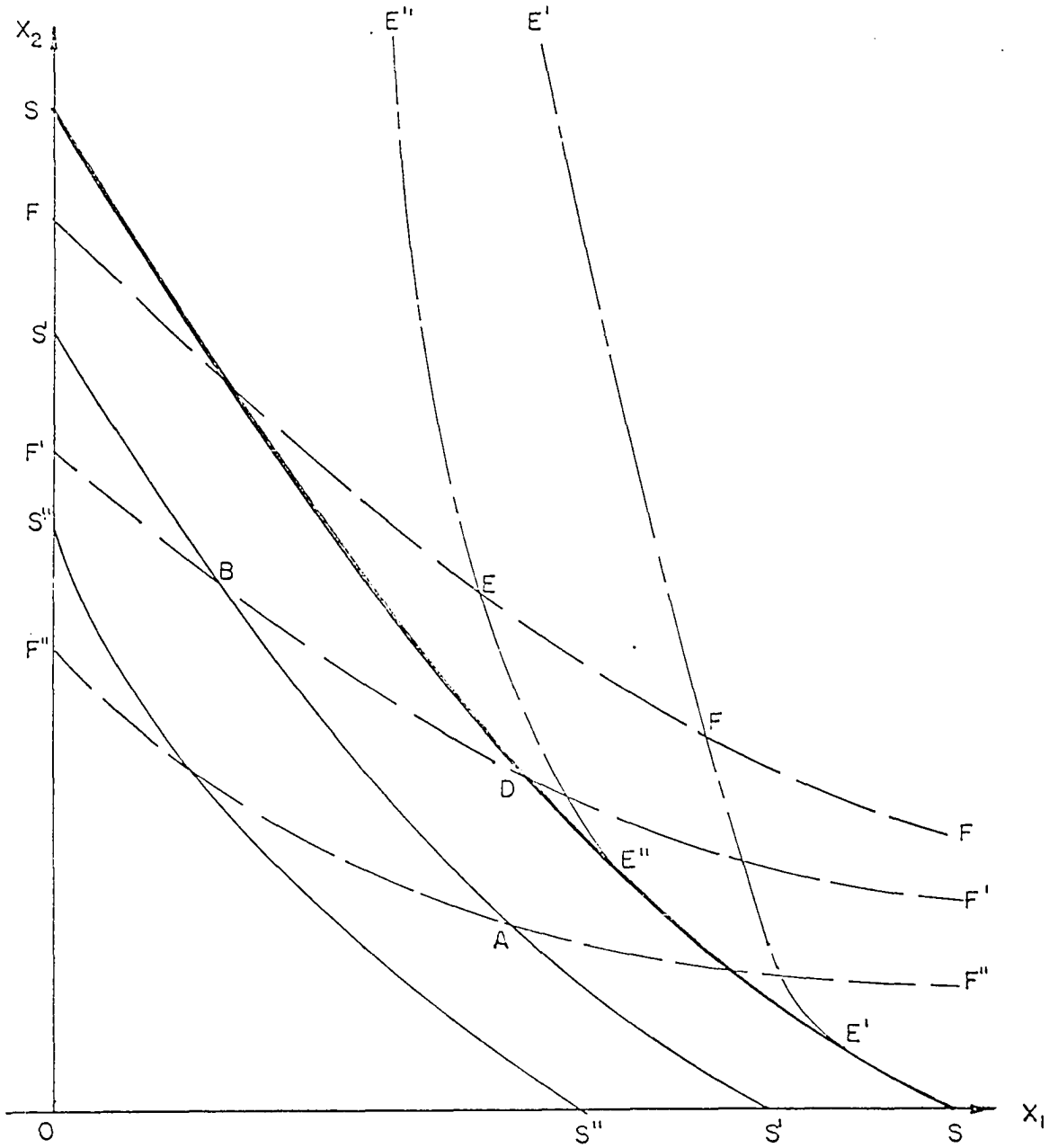

Figure 4. Behavior curves

wants f. We will also have the family e'e', e''e'', etc., originated by the want e.

Point A represents a point on the behavior line s's' but lying on f'f'. As explained before, f'f' is preferred to f''f''. Therefore, the point B will also be preferred to A. Following the same argument, point D is preferred to point B and point E will be preferred to D, while F is preferred to E. Note that at this latter level want s does not have any influence on our choice.

This indicates that we can order the alternatives we have between the two axis exactly as a chain.

Now we are ready to consider our example and study how to choose between our alternatives C' and C''.

If we assume that the levels of governmental and non-governmental control are of such a nature that with the combination C' we attain the level s''s'' or c' (x1' + x2')= s's', then our choice will be to choose the alternative two represented by C'', because C'' will produce at a higher behavior curve of the family s, which is our basic want. The different degree of control used under alternatives C' and C'' will determine their difference in level of attainment of the s want, i.e., desire for a subsistence production.

2) If we assume that levels of governmental and non-governmental control are of such a nature that we can attain s's' and C' (x1' + x2') = C'' (x1'' + x2'') = s's but the combination of x1 and x2 produced is such that C''

is on point A and C' on point B, then we will choose C' because even though it is on the same behavior line s's' as C'', it attains a greater curve f'f'. This means that under these conditions we will make our choice, taking only the second order want as a basis for decision.

3) If we assume that C' (x1' ÷x2') = s's' and C'' (x1' ÷ x2'') = SS or higher than SS, then we will also choose C'' because it attains a higher s want.

4) Let us now assume that C' (x1' ÷ 2'') is higher than SS. Then the want s will not be used as a criterion of choice any more, and we will choose according to the level of the behavior curve f attained by C' and C''.

The understanding of these simple concepts seems to be important for choice. Hereafter, if this theory can be proved to be right, when we talk about the maximum satisfaction of the human wants in accordance with our norm, we will have to make the qualification of what wants we are talking about; so we will first have to order them according to priority. The problem becomes much more involved when we study the risk and uncertainty considerations more research should be done to improve this theory.

Let us consider the application of these principles to appraising alternative institutional arrangements for improving the conditions of community units.

First we must identify the basic want s. This is the responsibility of the elected representatives of the people

who will decide what is best for their representees. Thus, members of the community would be expected to express their wants through him. We will here assume that the representatives have studied the problems and desires of their representees and that they have decided that their wants are the following:

The basic want is assumed to be the attainment of enough income for subsistence (consumption equal to production). Of course, consumption will increase when the people increases but the habits to which they are accustomed may not change rapidly. The threshold in the determination of this level would be the maximum level at which the second want will start acting as a determinant of choice without the influence of basic want s. The second want (f) is assumed to be the degree of freedom the individuals prefer acting by themselves without outside influence of any kind. Freedom is assumed in the degree of private ownership of resources. People may not care too much about freedom of action if their standards of living are below the threshold of subsistence (s). Freedom will become an important factor for choice after the farmer has passed the threshold of subsistence farming.

In conclusion the hypothesis is advanced here that most farmers included within the community unit are below the threshold of the maximum level of want s (attainment of enough income for subsistence) and therefore, these farmers

would be willing to accept any degree of influence from the community unit council if they are certain these policies will let them increase their incomes and attain their target variables. With this assumption in mind and assuming the structures of the Peruvian agriculture permit a reorganization similar to the community unit in the near future, we will start a theoretical study of the labor supply and demand of community people.

b. Labor supply and demand relationships A community under the present conditions of the Peruvian organization could be assumed to be a hacienda with many laborers. Some of the laborers live in the hacienda and are given a piece of land to use with part of their labor; some others are not given a piece of land and come to the hacienda from other nearby places.

At this point the community unit is not studied as a closed economy rather it is an open economy because the influence of nearby places is strong and there is mobility of resources and products to the outside. Under these assumptions we will start the study of labor supply and demand relationships.

Present day farming structures are related intimately to the labor supply and demand. Figure 5 depicts the labor market. Two quadrants are included in this figure.

In the right quadrant, the horizontal coordinate represents the number of laborers and the vertical coordinate the

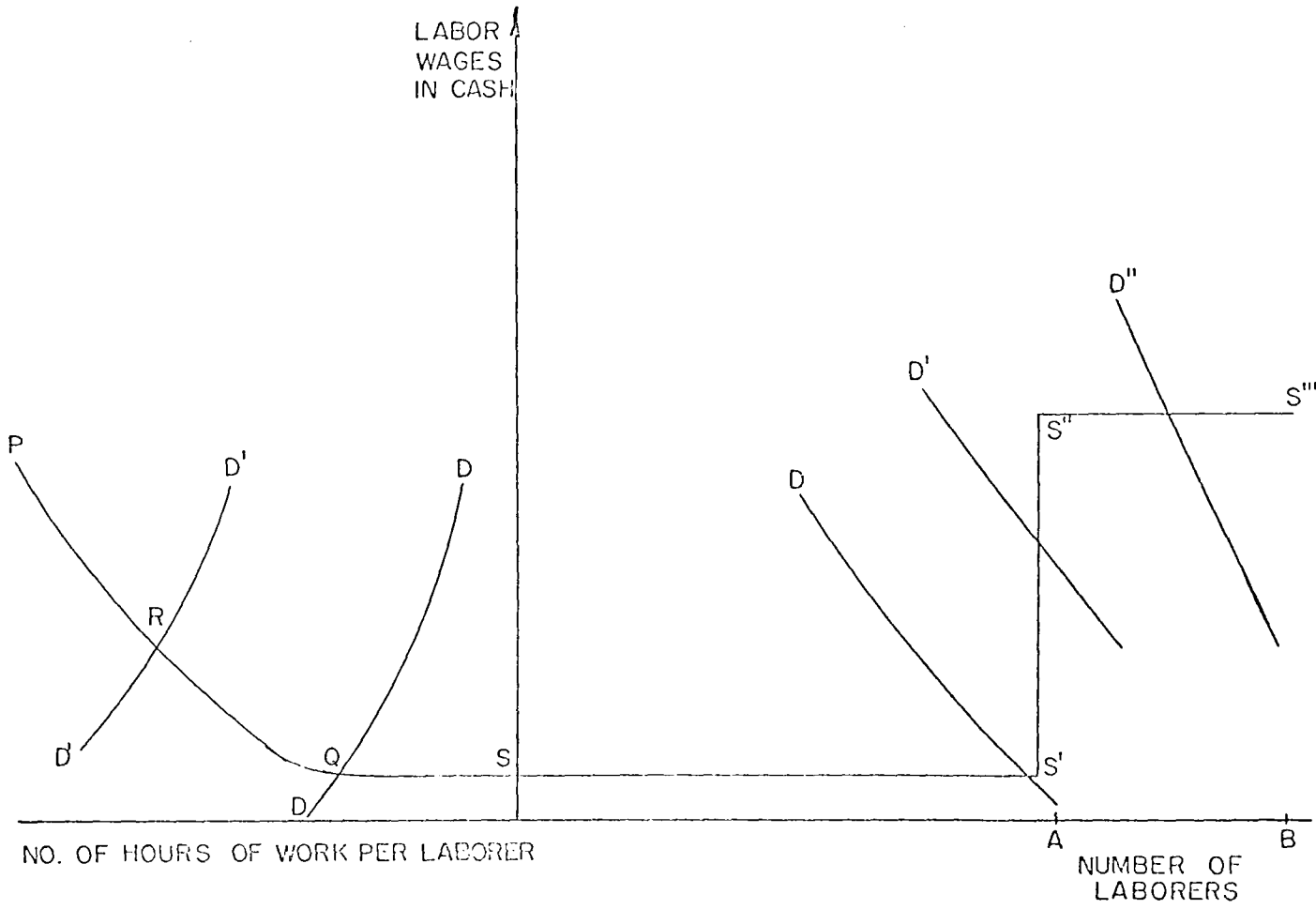

Figure 5. Labor market at the community level

wages in cash of laborers. Cash wages are used because it is difficult to measure other kinds of wage payments and also because laborers usually regard cash wages as a measure of exploitation.

The curve is divided into three main sectors. The first one is infinitely elastic (SS') and represents the lowest cash wages the villein laborers (laborers living in the farm) are willing to receive in addition to wages paid by the farm with a piece of land. The number of villein laborers is OA. The second section of the supply is completely inelastic (S'S'). This indicates that laborers living outside the hacienda and paid only cash wages are not willing to work for wages less than S''. Indian laborers are a given number; this number does not usually change. However, there are more people within or around the hacienda who are not granted a plot of land. These laborers originate the third part of the supply (S''S'''). This labor force is used by some haciendas in need of extra labor during given periods of the year. In addition to the three segments of the supply curve there are three inelastic demand curves on Figure 5. Curve DD represents present conditions of the absentee owner's farm and shows that he does not demand more laborers than the available ones in the farm. However, during special years or on special occasions there are some special jobs outside farming to be carried out on the hacienda, such as road improvement and canal repairing,

which would cause a shift of the demand curve to the right (D'D'). The extra amount of work is paid at higher cash wages, as indicated by the crossing point of the supply and demand (P). The demand curve D"D" is the typical demand curve of the non-absentee owners' haciendas hiring outside laborers in order to perform extra jobs required to improve production in certain periods of the year. Point T is the institutional wage of the region, which is hypothesized to be no higher than the subsistence level and it is defined as the minimum wage capable to provide people living in the region with sufficient income for subsistence at the consumption. It is defined in other words as total consumption divided by the number of people.

The left quadrant of Figure 5 refers to the same problem outlined on the right quadrant. However, the horizontal coordinate measures the number of hours of work per laborer instead of the number of laborers. Point Q indicates the minimum amount of work the villein laborers are required to do at the owner's land, measured in hours of work, in order to stay in the hacienda. Point R represents the cash wage paid laborers to perform temporary extra jobs in addition to the institutionalized minimum number of hours they are expected to work. Curve QRP indicates that in order to perform extra jobs on the owner's land the laborer wants to be paid higher wages in cash than usual. The wage would increase according to the amount of work to be performed but it does

not go to higher levels than the institutional wage rate. This is because it would be more convenient for the owner to hire laborers from nearby places.

Let us now make a further analysis of the conditions of laborers on an absentee owner's hacienda (Figure 6) in order to understand their productivity and employment levels. The cultivation within this hacienda follows the double system: Land for the owner and land for the laborers; however, laborers are the only workers in both lands. Low productive lands are given to laborers. In return for this land they have to work on the land for the owner. The labor productivity will be analyzed separately for the rented lands and owner's land using partially the scheme developed by Ranis and Fei (37).

Laborers are in surplus on the rented lands. They cultivate their poor lands as much as possible in order to attain the highest total physical product. Let us assume that one hundred laborers live on the farm under this tenure system. It is assumed that thirty of them are redundant laborers and another thirty are in disguised unemployment. This is shown in Figure 6, sections A and B where OH is the total number of laborers; FH is the number of redundant laborers and GF are the disguisedly unemployed laborers. This indicates that the Indians are not fully utilized. They work less hours than the normal member they could work. The total physical product is assumed to be the same as the

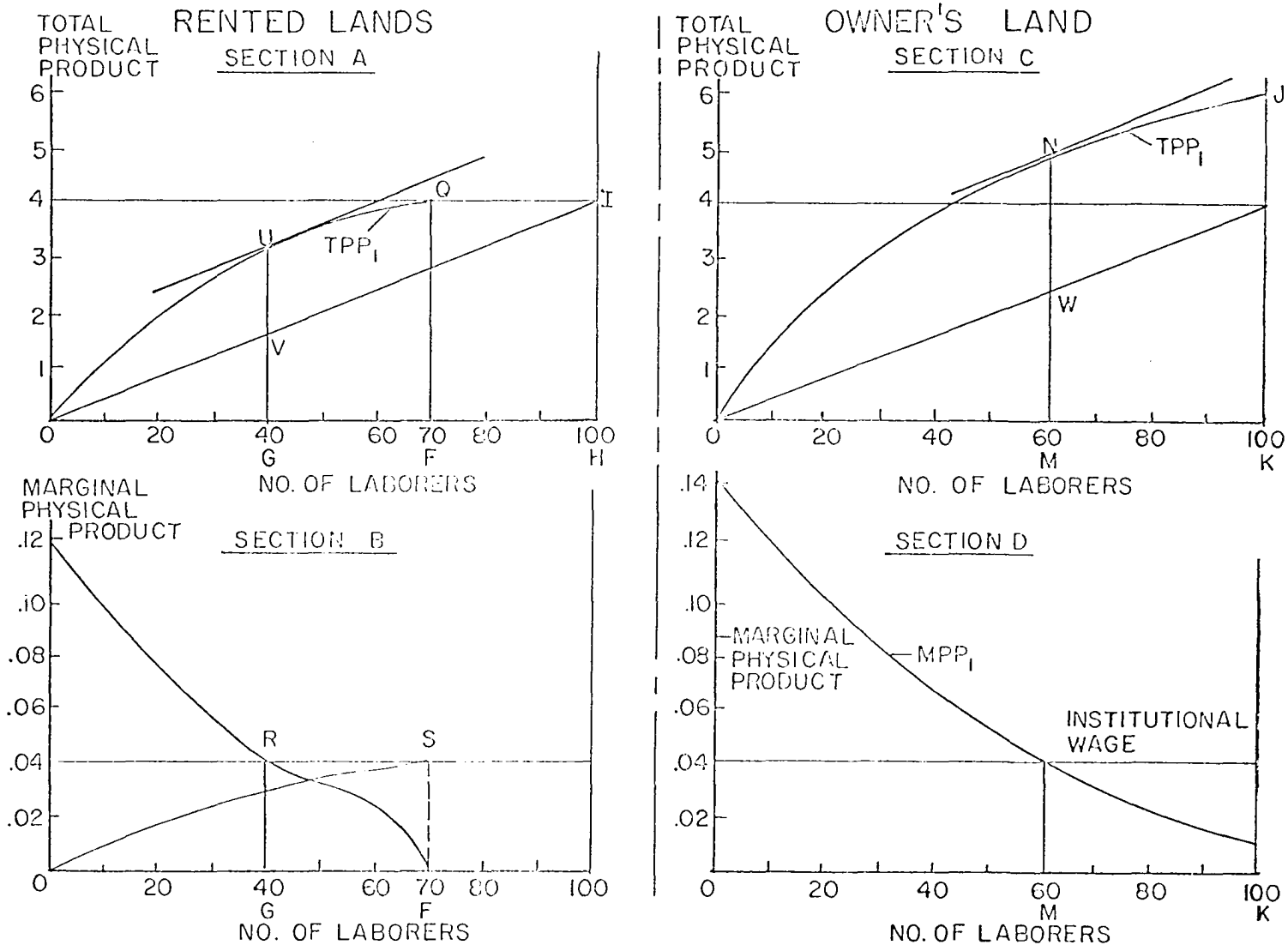

Figure 6. Labor productivity and employment in an absentee owner hacienda

institutional wage rate measured in agricultural products (HI). This is also assumed to be all the income they obtain from farming. However, in addition to their work on the rented lands they also work on the owner's lands where the situation changes in that the laborers work with a total productivity equal to SK (Figure 6, sections C and D). We assume that there are forty disguised unemployed laborers (MK) on the owner's land. The total output JK is absorbed by the absentee owner who spends this income in activities other than this farm. The marginal physical product of laborers at point K is greater than zero but smaller than the institutional wage rate.

This double system is full of inefficiencies and it is the origin of conflict between the owner and the Indians. Indians are not willing to work efficiently at the owner's land because they think they are paid small wages. (The cash wages paid to the Indians is paid back to the owner as cash rent for the rented lands. This is the reason why it is not included in the present analysis.) The owner in turn insists that laborers should work harder and efficiently because they are paid for their work on the owner's land with the rented land.

In order to improve this tenure system we will assume land is expropriated from the owner and transferred to the laborers. The assumption is to keep the total physical product of labor on the owner's land as a reward for their labor.

The assumption is made that the redistribution has already taken place and some laborers have been transferred from the rented lands to the owner's land. The sixty disguisedly unemployed laborers on the rented lands are transferred to the owner's land. With this transference the total physical product would be UG - NM which according to Figure 6 sections A and C is greater than double the output HI which was previously obtained by the Indians. This also indicates that all of the laborers obtain a marginal physical product equal to the institutional wage which also indicates that redundant laborers and disguisedly unemployed laborers disappeared. Furthermore, since there is a transference of sixty laborers from rented lands to owner's lands a total surplus UV develops (UV = GL.60) since sixty laborers were transferred to the owner's land and hence are not consuming from the production of the rented lands.

If consumption is held at the same subsistence level, the total surplus in both rented and owner's land after redistribution would be UV + NW (Figure 6, sections A and C). Assuming laborers are organized in a community unit, they will have the problem of the investment of the total surplus. If the marginal productivities are the same after redistribution (although productivity is likely to increase because of the incentives of working on their own lands), the marginal physical product for the one hundred laborers would be FG (Figure 7, section A). At this point the

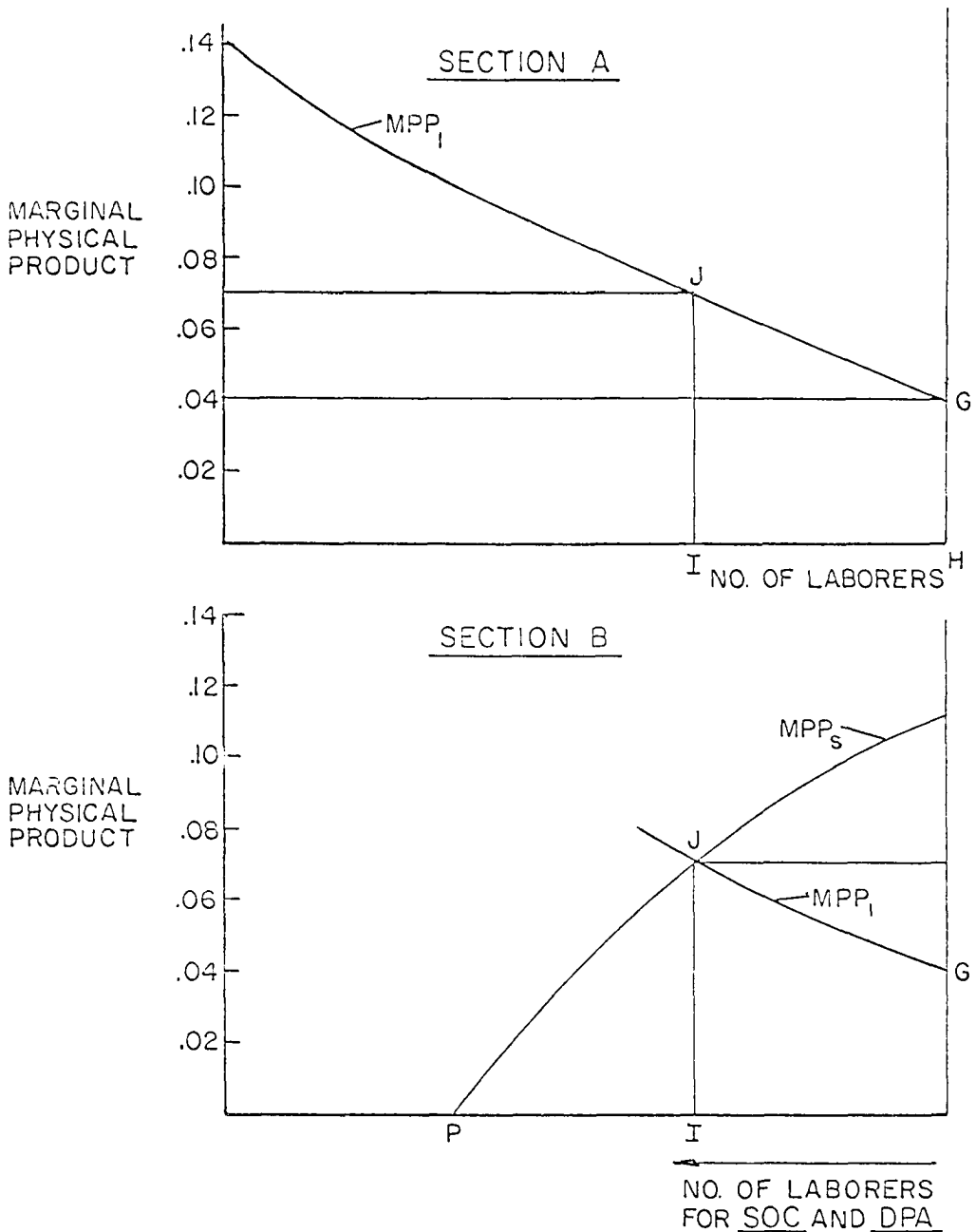

Figure 7. Contribution of the community to the increase in labor productivity

community council decides to act in order to attain an increase of income over subsistence, let us say, JI. This implies an absorption of thirty-five laborers out of agriculture. This could be attained by using the total surplus for paying these laborers to work on community projects with SOC purposes including the construction of roads, canals and schools and training people in schools. This activity could be initiated with few tools which the council would provide from savings obtained from the community members. If the council thinks it is necessary to start DPA (direct productive activities) such as building a factory for industrializing the community's product it could take steps to encourage these activities.

Theoretically, the council would promote SOC and DPA activities outside agriculture in order to employ disguised unemployed laborers. They would attain the income IJ (Figure 7, section B). Assuming their labor productivity is QJP (reading from right to left) the results of this type of activity would be as follows: The absolute increase in total value productivity would be GQJ. This would also contribute to make the MVP of both types of laborers to be equal to the target income IJ.

The above analysis is theoretical in nature, but the hypothesis is made that SOC and DPA may have greater productivity than farming with the present methods. The community council will need the help of a higher policy-

making level to obtain part of the necessary capital for the new activities.

The other policy means the council should consider are 1) availability of capital resources owned by the community (A.B.2. b.), 2) taxation to farmers by community unit for better uses of capital (V.A.), 3) entrepreneurship (B.3.) and 4) institutional variables affecting prices (IV.C) with the adoption of the suggested redistributed system of community unit, two target variables would be attained (reduction of the redundant laborers and provision of equal opportunities to all members of the community). However, the increase in income of the community is still subject to improvement and the council has some policy means for generating it.

The redistribution of land would generate the community unit as a defined policy-making unit with a given number of members. The council of the community unit would look out for the welfare of these people only without the worries of improving members of other communities. Through policy means 1 and 2 the council would absorb some of the earnings of the community members in an effort to keep consumption at low levels and to create capital for investment in the community. Net returns of the agricultural laborers could be absorbed partly for investment in the non-agricultural activities. In addition to the above mentioned DPA and SOC activities the community could become a unit for a cooperative movement for production, marketing, savings, etc. The

effect of the cooperative production, especially through pools of tools and machinery, would be to decrease costs of production, while the effects of the marketing cooperative would be an increase in prices of products especially if the markets are small and imperfect as is the case to be the analysis of the Ayacucho farm. This would increase marginal value productivity of labor. If activities other than farming have the greatest productivity, the council would allocate the money to activities with the highest marginal value productivity. This would generate a further reallocation of labor with more labor being used in activities other than farming.

The productivity of the community unit would be further improved if better management practices were used in agriculture and non-agriculture. The council would have an important impact if it performs managerial activities, especially in supervision and supervised credit. The council could arrange to obtain more capital (it could be cash or in kind) from other policy-making units and provide it to the community unit laborers after a production plan had been made up. Later on they would supervise this credit. One of the difficulties would be to find good managers and technicians to supervise the community unit members, but this might be the responsibility of higher policy-making units.

c. Variables generated in other policy-making levels

Other levels of policy-making supplement the efforts of the

farm and community levels to attain their target variables and also intervene when the target variables of these lower policy-making units are against the targets of the regional level. The target variables at the regional level are influences by the aggregated community units within their borders and by the side effects resulting from their policies.

Most of the exogenous variables listed at the farm level could be used as policy instruments at other levels of policy-making.

However, it is important that the policy makers design a strategy for the best use of these policy instruments.

We have seen that the important policy means at the farm level were related to the productivity of labor. The problem of disguised unemployment cannot be solved in its totality by the community unit level. Problems of special significance at higher levels become the absorption of redundant laborers and also the decrease in disguised unemployment, especially by the creation of more activities other than agriculture (SOC and DPA) and the improvement of markets. Following is a model from which to study labor from this point of view.

Labor could be planned to be absorbed by the productive processes. The decrease in unemployment is a key factor in the model. Labor is not homogenous. There are many levels of labor productivity which can change from year to year.

Demands for the various types of labor are usually not fulfilled by availability especially of highly prepared labor. There could be unemployment in each category which is important in Peru because we observe that even highly educated people are unemployed. An input-output model could be used to explain the demands for various types of labor. The model could be (using matrix notation as is presented by Dorfman et al (12):

$$X = aX + C$$

$$(I-a).\ X = C$$

$$X = AC \text{ where } A = (I-a)^{-1}$$

$$Xo = a'oX = a'oAC = a'o(I-a)^{-1}C = A'^{oC}$$

where A'o is the row matrix or row vestor $(Ao_1 \ldots\ldots Ao_n)$.

But it includes only the labor A, unskilled illiterate labor, while within the X industries the labor B is included. Therefore, the C sector is reduced by the amount of increases of the row and column labor B.

We are thus considering labor B as a productible activity included in the process of economy production which requires the participation of all sectors. This will also indicate the percentage of interdependence of the labor B (more skillful labor) with the rest of the economy.

We could construct an input-output model for the economy, assuming labor B is not a limitant factor, and this would give us the levels of attainment of gross national product of the economy.

This model could be extended to include various levels of what has been called unto now labor B. We could call them labor B_1, B_2.....B_n, maybe n = 4 or 5. This model would also indicate the levels of expenditure needed to attain higher education for the increase in labor productivity and it would also indicate which industries require more skillful labor and which require less productive labor. At the beginning of an industrialization process we would have to encourage the industries requiring labor B_1 and B_2, or people with second grade primary education (B_1), and with five years of primary education (B_2). This model could also be treated not from the physical point of view as presented up to now, but by using the quantitative model of Leontief (23).

Schultz (39) explains in a recent article:

> The failure to treat human resources explicitly as a form of capital, as a produced means of production, as the product of investment, has fostered the retention of the classical notion of labor as a capacity to do manual work requiring little knowledge and skill, a capacity with which, according to this notion, laborers are endowed about equally..... How to distinguish between expenditures for consumption and for investment. This distinction bristles with both conceptual and practical difficulties. We can think of three classes of expenditures: expenditures that satisfy consumer preferences and no way enhance the capabilities under discussion - these represent pure expenditures that enhance capabilities and do not satisfy any preferences underlying consumption these represent pure investment; and expenditures that have both effects. Most relevant activities clearly are in the third class, partly consumption and partly investment, which is why the task of identifying each component is so formidable and why the measurement of capital formation by expenditures is less useful for

> human investment than for investment in physical goods. In principle there is an alternative method for estimating human investment, namely by its yield rather than by its cost. While any capability produced by human investment becomes a part of the human agent and hence cannot be sold it is nevertheless in touch with the market place by affecting the wages and salaries the human agent can earn. The resulting increase is the yield of the investment.

This article is consistent with the model presented above, however, it does not specify the characteristic to measure the results of human investment. This is the reason why we have used education as a characteristic, with the following considerations:

(1) To have a concrete basis for estimating human capabilities considering we would have good census data.

(2) Every school in Peru teaches at each grade the same material, using the same books most of the time, and following the same official directions for teaching which provides people with a given level of education know about the same as any other with the same educational level.

(3) It would take more reliable statistics to provide exact data of other measurements of productivity.

(4) It would give a ready indication of the levels of productivity the country could attain and the kind of industries most likely to have success in a given period of the country's economic growth.

Schools are considered as industries, transforming labor A into labor B_1, or labor B_2, etc. It is important to know where the available capital for education should be directed

and what level or what percentage of the country's total capital should be directed to education. The important consideration here will be the needs for each kind of labor force by the most desirable industries for the economic development of the country and the marginal productivity of labor at each level.

The study of Balboa (2) about a comparison of the intersectoral structure of Perú and Argentina and the matrices calculated by the Banco de Reserva (4, 5) suggest that there is a large triangularty in the Peruvian input-output matrix. This means that there is not much backward and forward linkage according to the terminology of Hirshman (19) due to lack of industrial development which though linkages could stimulate the creation of industries providing raw materials for it or using their product as inputs. Therefore, the policy maker must act to encourage investment in industries that 1) transform domestic or imported primary products into goods needed by final demands, and change demand patterns toward these; 2) transform important semi-manufactured items into goods needed by final demands as suggested by Hirshman (20); 3) absorb larger amounts of redundant labor as suggested by this model; 4) increase the level of education of labor (schools).

III. ANALYSIS OF STRUCTURES OF THE FARM AND COMMUNITY: MICROECONOMIC ANALYSIS OF TWO SIERRA HACIENDAS

This section presents the partial application of the model to two sierra haciendas with their constituent farms. One hacienda is in Cuzco Departamento, hereafter called the Cuzco hacienda and one is in Ayacucho Departamento, hereafter called the Ayacucho hacienda. The Cuzco hacienda is an example of highly productive mechanized agriculture. On the other hand, the Ayacucho hacienda is exemplefied by a primitive agricultural system and low levels of productivity. The two haciendas were selected arbitrarily from the continuum of high to low productive haciendas existing in the Sierra region. Since there exists no available population from which to draw a sample, the two haciendas were selected according to criteria established at the beginning of the study to provide a highly productive and a highly unproductive farm[1]. The owner's land, cultivated by the Indians as laborers, constitutes a counterpart of the community level. The study

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[1]A conceptual analysis was undertaken prior to selection of the specified the following criteria for selection: 1) Underutilization of land in terms of intensity of land cultivation and percentage of land to agricultural use. 2) Labor in the hacienda is utilized during certain periods of the year and low levels of education and efficiency of labor. 3) Dissatisfactions among the Indians in terms of low income levels and low social and economic status. (4) Conditions of community stability permitting a study. 5) Combinations of irrigated crops, dry farm land and pasture land. 6) Not more than fifty families or less than twenty-five families. 7) A community not larger than 5,000 hectares.

starts with determination of the productivity of laborers, the income distribution and the associated structures. The analysis then continues with the formulation of a diagnostic hypothesis to identify the failure and success elements for the attainment of the target variables suggested in the model.

A. The Cuzco Hacienda

1. Existential situation

The Cuzco hacienda was selected within a district containing sixteen haciendas. Their characteristics are summarized in Table 5, most of them having a similar structural organization. The Cuzco hacienda was reported to use the improved techniques of production in the "distrito" according to discussions with representatives of the Extension Service in the district.

Total area in the Cuzco hacienda is 1,213 hectares at the core hacienda with an additional 2,000 hectares in the annex area. There are 259 hectares on which the owner cultivates commercial crops. The rest of the land is steep and not suitable for cultivation with machinery. The laborers plant their crops on these steep areas, using the "chaquitacclla", or foot-operated plow, which was first used by the Incas and in less steep places oxen pulled plows.

An annex to the Cuzco hacienda is located two kilometers from the core hacienda. Starting at an altitude of

2,730 meters above sea level and reaching 4,000 meters. The main reason for its existence as an annex is its ability to provide a labor force for the main farm. There are forty-five families living on this annex.

The Cuzco hacienda is managed by its owner. He lives most of the year at the farm, with semi-monthly trips to Cuzco city to transact business. Currently, 57 hectares are planted in sugar cane, 110 hectares in corn, 54 in wheat, 4 in alfalfa, and an additional 34 hectares are in the process of preparation for sugar cane.

a. Farm level: rented lands The model suggests that the end-in-view for the farm level is to increase productivity and income of the policy maker -- the farmer. However, according to the conditions of the Cuzco hacienda, when we talk about the farm level we will be referring to the land rented by the Indians and being worked by them are rented land. Therefore, the farmer in the above sense is not the operator of the hacienda, but the Indian who rents a plot of land in the core hacienda or the annex. Each one of them receives a plot of land from the owner. They are required to work for six months of the year on the owner's land as a payment or rent for the use of their rented lands. The core hacienda and annex laborers are studied here.

The average income obtained by the core hacienda laborers is S/. 4,947.04 per year. The annex laborers receive an average of S/. 10,483.26 per year. This indicates that income

of the annex laborers is more than double the income of Cuzco farm laborers (Table 4). Structures or exogenous variables determining these differences in income are analyzed in the model as follows:

I) Resources

A) Ownership An important determinant of income is ownership of resources. Annex laborers have more owned resources than the core hacienda laborers and this was partly due to savings and investments as a resultant of a greater time to work in their own farming instead of the owner's. The ownership of resources is implicit in the study of the class of resources.

B) Class of Resources

1) Land and land resources Core hacienda laborers cultivate smaller rented plots than the annex laborers. Thus, when rented lands are grouped by size, 50 percent of the core hacienda laborers are farming on lands from 0.2 to 0.4 hectares (average 0.279 hectares) while 50 percent of the annex laborers are farming lands above one hectare (average 1.304 hectares) (Table 5).

2) Capital resources The core hacienda laborers have less income coming from the use of capital resources (cows, donkeys, horses, tools and huts) than the annex laborers. This is due to the higher amount of capital resources the annex laborers have (Table 6). The core hacienda laborers obtain S/. 1,237.25 income from the use of

their capital resources, while the annex laborers obtain S/. 7,365.90. This factor is a very important determinant of income since annex laborers draw 70 percent of their income from the use of these resources in contrast to Cuzco farm laborers who only obtain a 25 percent income from this source. Indian laborers were ranked according to their incomes and it was observed that 2.82 percent of total income of farmers belonging to the group of S/. 1,001.00 to S/. 2,000.00 income was due to capital resources, while 79.30 percent of the income of Indians belonging to the group of over S/. 10,001.00 income was due to capital resources.

3) Entrepreneurship There appears to be little difference in management even though yields of the annex are lower than yields at the core hacienda because of the quality of land and weather associated with altitude. Thus, yields of corn are 835.79 kilos per hectare for the annex and 862.83 kilos per hectare for the core hacienda. Wheat yields are 1,201.97 kilos per hectare for the annex and 1,215.70 kilos per hectare for the core hacienda (calculated from Table 3). This lower productivity may be due not to management but to cold weather, steep lands and climatic environment of the annex lands.

4) Labor Both annex and core hacienda laborers are given a plot of land as large as they can cultivate. However, core hacienda laborers have cultivated smaller areas than annex laborers. Both core hacienda and annex laborers

are given a plot of land as large as they can cultivate. However, core hacienda laborers have cultivated smaller areas than annex laborers. Both core hacienda and annex laborers are paid around S/. 7.00 per day during the six months they are required to work at the owner's land. Why do core hacienda laborers cultivate smaller plots than the annex laborers? The answer may be found in the system of wage payment. Not all laborers are paid wages in cash. The farm has a store where laborers can get clothing, grain, meat, alcohol, etc. From this store core hacienda and annex laborers can obtain goods in advance of their wage payment given to them at the end of the month. Annex laborers seldom buy from this store. Core hacienda laborers, on the contrary, obtain advancements in cash and in goods from this store before the end of the month. This seems to be an advantage for them; however, the advancements are so high that wages (paid at the end of the month) are not enough to cover their debts. The debts are about double their wages, which means that Indians spend monthly more than they are paid (Table 8). This situation enables the owner to force laborers to work on the farm beyond the six months as required.

In order to support the above statement, a regression analysis was made between days of work above the required 182 days and the debt balance at the end of the month. The results from this regression as presented in Figure 8. The formula for the regression is:

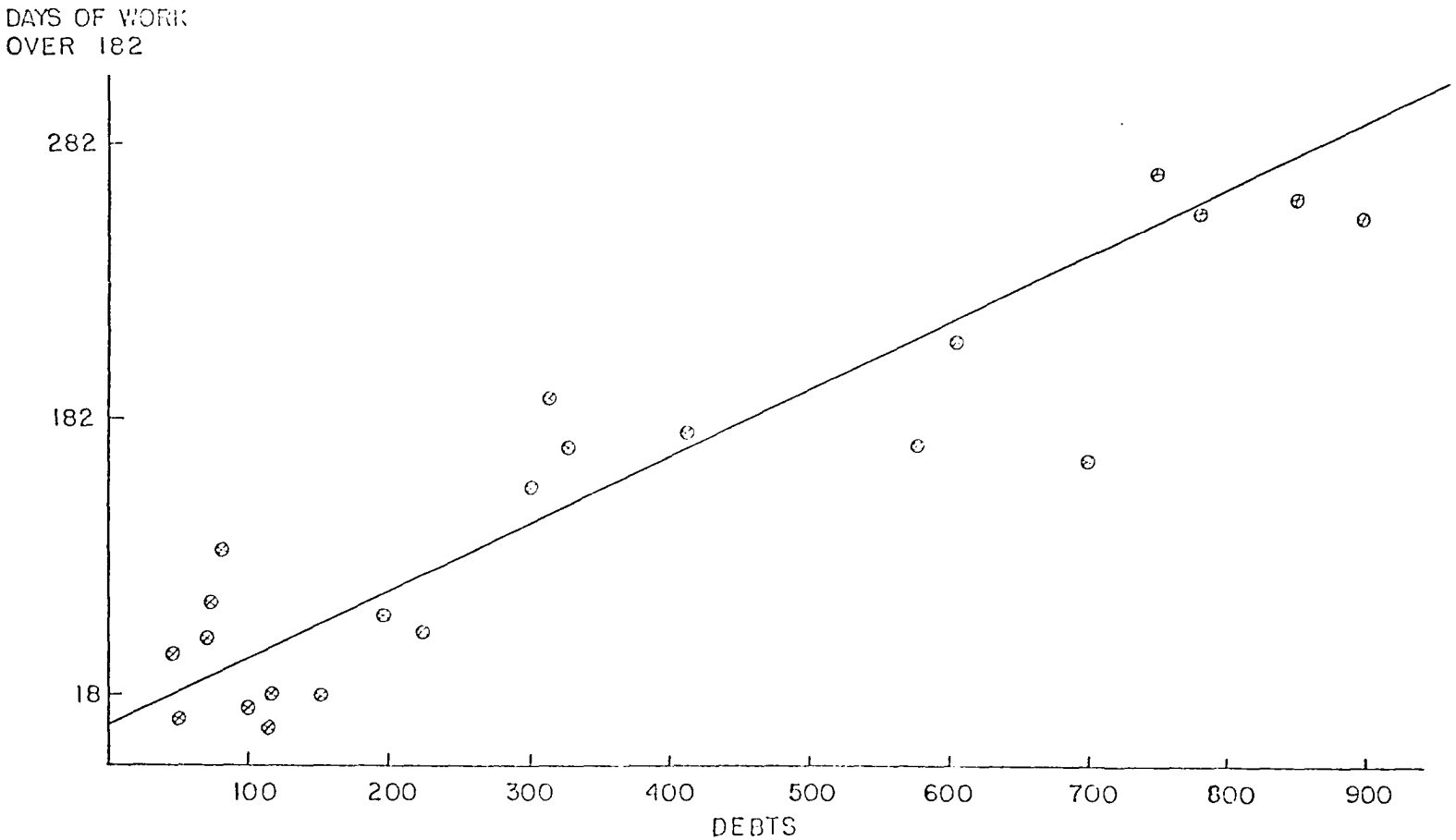

Figure 8. Influence of debts on days Cuzco farm laborers work at the farm

$$Y = 4.98 - 3.7657337X$$

Coefficient of correlation: $r = 0.8971$

Variance: $s_b^2 - 0.80094638$

The test of the hypothesis Bo = 0 considering error of 0.05 percent gives the following result:

$$0.3720837 \quad Bo \quad {}^{7.1593837}$$

Since annex laborers allocate more time to cultivation of their rented lands and to grazing their livestock, they obtain higher incomes from these activities which are determinants of their higher incomes.

Another determinant of income per capita is the number of dependents. On the average, unmarried core hacienda laborers have an income of S/. 2,972.47 per capita (Table 9), while the income per capita of unmarried annex laborer is S/. 4,490.52. A core hacienda laborer with eight dependents obtains an income per capita of S/. 1,027.88 while the same kind of laborer at the annex obtains S/. 1,974.39 per annum.

b. Community level: The Cuzco hacienda as a whole

The model suggests that the target variables at the community level are levels of productivity and income of the community, levels of employment, and opportunities to all people within the community.

The hacienda as a whole is a community of people living within the farm. The main authority is the owner. The owner's land and rented lands represent all the land of the

community. The Cuzco hacienda as a whole is studied here following the classification of resources considered among the exogenous variables given in the model.

1) Land and land resources The Cuzco hacienda as a whole the community -- is owned by one owner. The Indian laborers are, therefore, working on rented lands. Productivity and size of land is different for the owner and those who rent lands. On the rented lands, average yields per crop for corn is 862.83 kilos per hectare and for wheat, 1,315.70 kilos per hectare. On the owner's land the average yield per crop is 3,000 kilos per hectare for corn; 3,840 kilos per hectare for wheat. On the owner's lands there are two periods of cultivation per year, making a total of 6,000 kilos per hectare of corn and 7,680 kilos per hectare for wheat per year. These figures indicate that the owner's land is around seven times as productive as the laborer's land.

Owner's land can be classified in groups II and III while Indians' land can be classified in group V (See the model -- Farm level).

The rented lands are below subsistence or at subsistence in the Cuzco hacienda in that all products are consumed or traded for consumption. The owner's lands are above subsistence. Subsistence was defined earlier as the level of production which permits the farmer to have an income equal to consumption. Land is distributed unevenly in the Cuzco farm. The owner reserves 260 hectares for cultivation for

himself, while the average surface the Cuzco farm laborers cultivate is 0.530 hectares and the annex laborers, 0.932 hectares.

2) Capital resources The owner works with his own and borrowed capital. The Indians do not borrow. Figure 9 shows the credit situation of the Cuzco hacienda owners. This indicates that the owner could get borrowed capital for an efficient work while Indians have to rely on their own resources (Table 10).

3) Entrepreneurship Ability for management could be measured by the level of education and by other factors. The owner of the hacienda as the manager; he does not work as an operator and his education is high. The Indians are managers of their rented lands. They are also the operators, and they have no formal education. As a manager, the owner obtains S/. 15,700.51 per hectare if he cultivates first year sugar cane; 18,185.51 with second to fourther years of sugar cane; S/. 7,448.51 if he plants one hectare of wheat; and S/. 8,609.29 if he plants one hectare of corn. The Cuzco farm laborers would only obtain S/. 2,400.00 if they planted one hectare of corn and S/. 1,334 if they planted one hectare of wheat. However, their total income is just S/. 390.00 because they are unable to cultivate a full hectare under the working conditions analyzed previously (Table 11).

4) Labor The operators of the owner's land are

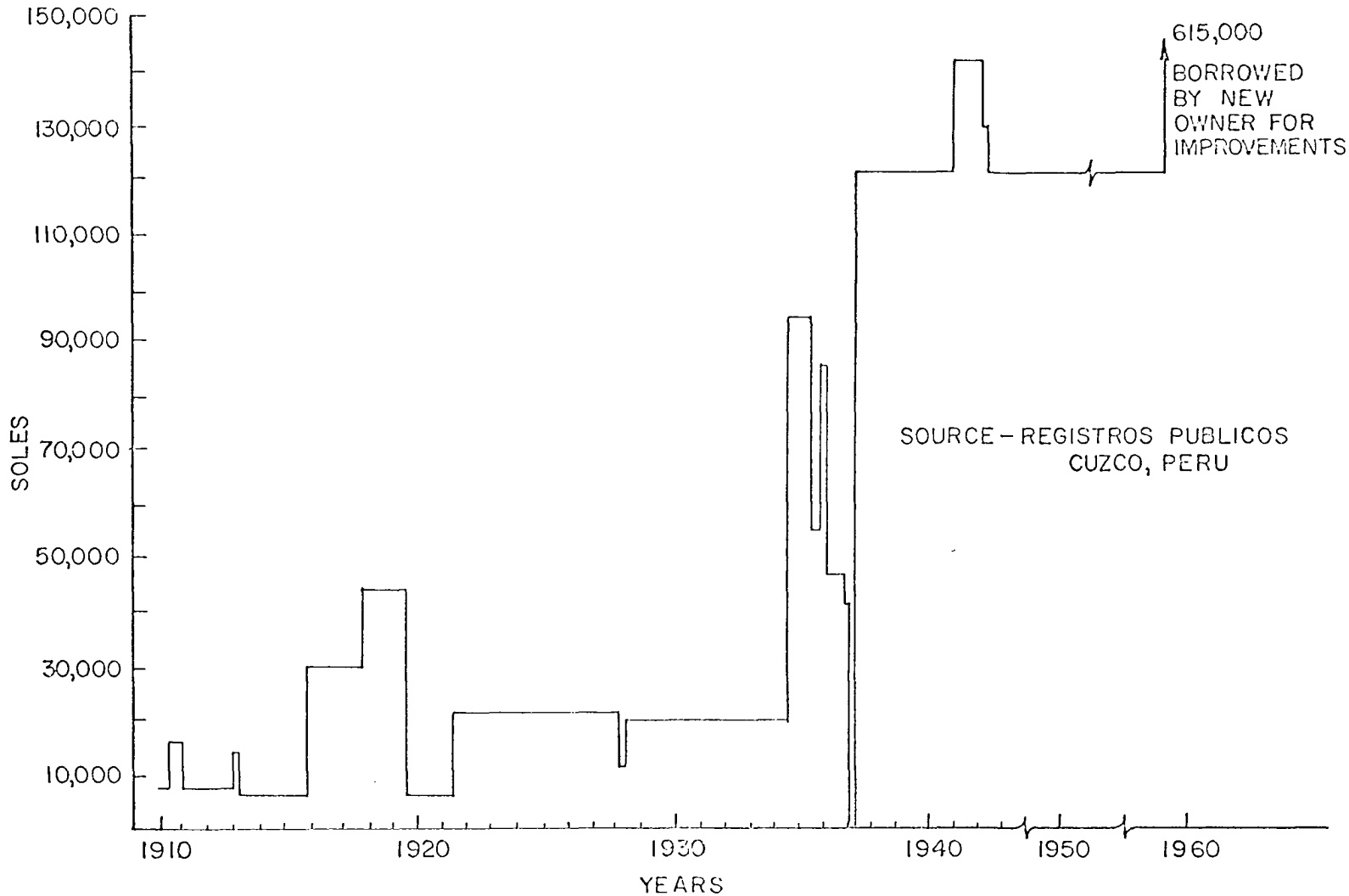

Figure 9. Mortgage history of the Cuzco farm

groups of people while on the rented land they are individuals. The tenancy system is such that payment is made by working the owner's farm.

Labor productivity can be measured by the amount of land a laborer is able to cultivate during the year. In order to cultivate an hectare of sugar cane on the owner's land 1.11 men work every day of the year, including Sundays. Therefore, a laborer cultivates only 0.9 hectares of sugar cane. Another statistic, this time calculated for the whole farm, indicates that 386 days of labor are needed to cultivate a hectare of land (calculated from Table 12). There, a laborer working every day of the year is able to cultivate only 1.4 hectares if the data of the farm as a whole are taken. These statistics provide indices of the labor intensive techniques of cultivation.

2. Diagnosis of the Cuzco hacienda

Diagnosis is made on the basis of the existential situation and the target variables stated in the model. The labor supply and demand relationships confirm the hypothesized model at the community level. Annex laborers who do not work more than six months obtain an average daily wage of S/. 6.09. Laborers coming from other places receive an average of S/. 7.51 per day. The core hacienda laborers are paid higher wages in cash than the annex laborers because they perform extra jobs besides the required ones.

The demand for labor on the Cuzco hacienda is higher than the number in the resident labor force. Fifty-eight percent of the work is done by the Cuzco farm laborers; sixteen percent is done by the annex laborers; and twenty-seven percent is done by outside extra laborers (Table 13).

The analysis of the existential situation shows that there is a considerable difference in the Indians' per-capita income in relation to the owner's income. This difference creates conflict between the laborers and the owner. There is discontent among the laborers and most Indians interviewed expressed a feeling of being exploited. This discontent could lead to open revolt against the owner.

There was a rebellion on the nearby hacienda. Ownership had been claimed by the municipality; however, titles proving ownership did not exist. Laborers paid rents to the municipality in an indirect way. The municipality rented the hacienda to five owners of nearby farms, one of them the Cuzco hacienda owner. These renters did not cultivate this land. The purpose of renting the land was to use the Indians living thereon as laborers on their respective farms. The Indians had an obligation to work on the renters' haciendas six months of the year. They had the feeling that they were exploited and were paid below normal wages, so they formed a labor union. The labor union decided that the Indians should not work at the renters' haciendas because they were the owners of their plots of land. This conflict went to

court. The court decided that the Indians should continue paying rents (working six months at the renter's haciendas). The Indians did not accept this resolution.

The labor force may be rewarded at rates below their productivity. There is a big difference between the net income obtained by the owner and the income obtained by the laborers. The owner's net income for a one-year period is S/. 1,536,630.34 (Table 14). The average net income obtained by laborers is S/. 4,947.04 per annum (Table 6). The owners' and Indians' net incomes were calculated by subtracting variable and fixed costs, except management, from the gross income.

There is also a difference in the incomes of laborers. Around one-third of the Indian laborers working on the Cuzco hacienda are in a total gross income bracket ranging from S/. 2,000.00 to S/. 3,000.00 with an average of S/. 2,413.44 per annum. The other two-thirds are distributed from an average of S/. 1,413.76 to an average of S/. 12,377.47.

On the average, 59 percent of the total gross income per worker comes from his wages; 25 percent comes from capital resources, and only 8 percent is from crops.

Indians work on the owner's lands in order to obtain a plot of land for cultivation. However, they do not work efficiently. The owner has to provide "mandones" (a kind of guard) to force them to work. They are forced to work a long period every day. The work starts at 6:00 a.m. and

continues until 12:30 p.m. and from 1:30 to 5:30 p.m. This is a 10 1/2-hour schedule of work. This schedule can be qualified because they lose some time going to the land for work and taking breaks for "chicha" (sugar cane juice in process of fermentation).

This long schedule does not permit the laborers to work on their own plots. Their families have to work the plots and this work is both inefficient and inadequate. Thus, the core hacienda laborers must rely on wages for their livelihood. The annex laborers have different outlooks concerning work and sources of income. They are given bigger farms. they raise their own livestock and they do not have to work six to twelve months of the year on the owner's land. The latter is due to the fact that they have enough money during each month and do not need to ask for advancements greater than their income. They have the incentive to work on their own plots most of the time. Thus, they have a higher income than the core hacienda laborers.

Core hacienda laborers usually do not have oxen for working their own plots. One day of work by rented oxen costs S/. 20.00. Most Cuzco farm laborers cannot afford to pay this amount in cash. They have to work mostly with "chaquitaclla" (foot operated plow).

Because of this lack of money, they cannot buy seed, fertilizer or insecticides.

The analysis of this system suggests some important

actions for improvement.

The annex laborers accumulate capital in the form of livestock; some buy considerable amounts of livestock. They also have demonstrated ability for trading. If they were provided with technical advice about breeds of livestock, management of grasses, etc., they would attain an even higher income.

Annex laborers show ability for working hard and improving their methods of production. The incentive is the plot of land they are given, and the six months they are left on their own. Their willingness to improve their living conditions is high. Some of the interviewed laborers said they would expect to send their children to school. Family improvement is another high incentive they have for working efficiently.

Cooperative work is observed among the Indians, especially among relatives or friends living in the same area. They share their oxen when they need to perform an urgent job. It is also observed that they help each other in various farming activities. This indicates they could develop cooperatives if they were provided leadership and a system of organization.

B. The Ayacucho Hacienda

1. Existential situation

The Ayacucho hacienda located about 9,000 feet above sea level, includes approximately 2,000 tillable acres and 1,000 acres of non-tillable land used for grazing cattle. The latter is very steep land with slopes over twenty percent and the grass is scarce and short.

Wheat is the main crop, planted on eighty percent of the cultivated land. Some other crops planted on a few acres of land are corn, potatoes, beans, peas, "habas" and many other secondary crops. Every year twenty-five Indian families rent one-fourth of the tillable land. The other three-fourths is kept for the owner. These owners' lands are divided into three parts so that one is cultivated and two remain idle each year. Under this system each part is cultivated every three years, remaining idle for two consecutive years in order to "recover its fertility". No fertilizer is added to improve the soil because of 1) lack of knowledge about the availability of fertilizer, 2) custom and especially 3) the owner's reluctance to spend money. He does not have much money and is not willing to risk it.

There are twenty-five families living at the hacienda. The land assigned by the owner to each family varies in productivity but usually is of low fertility. Indian families pay a low rent (S/. 1.00 per year per acre) for the land they

cultivate. Farm cash expenditures are near zero, since the payment to the laborers (S/. 0.20 per day) is made once a year and it is offset by the rental charge to the Indians for their plot of land. The landlord is willing to rent the poorest land to the Indians, usually the badly eroded steep slopes or stony lands. The Indians work very hard on this land and try to obtain the maximum physical production out of it. The quality of their work on these lands is high.

The owners' lands are the best and most productive lands of the farm. They are flat, clean, and free of erosion. The owner pays the laborers S/. 0.20 per day of work. The Indian works inefficiently for such a low wage.

2. Diagnosis of the Problem

The Ayacucho hacienda as a whole is considered as a community and it is studied as such. As a first diagnostic hypothesis, willingness to work is considered a function of wages. The assumption is made that wages of Indians working on their lands should be S/. 10.00. This was determined by imputation of total value product to labor in terms of marginal productivity of comparable labor from other farms where all the factors were rewarded according to marginal productivity, other things being equal.

Using Leibenstein's reasoning (22), modified as shown in Figure 10, the productivity of labor is substantially higher on the "rented lands" than on the owner's land,

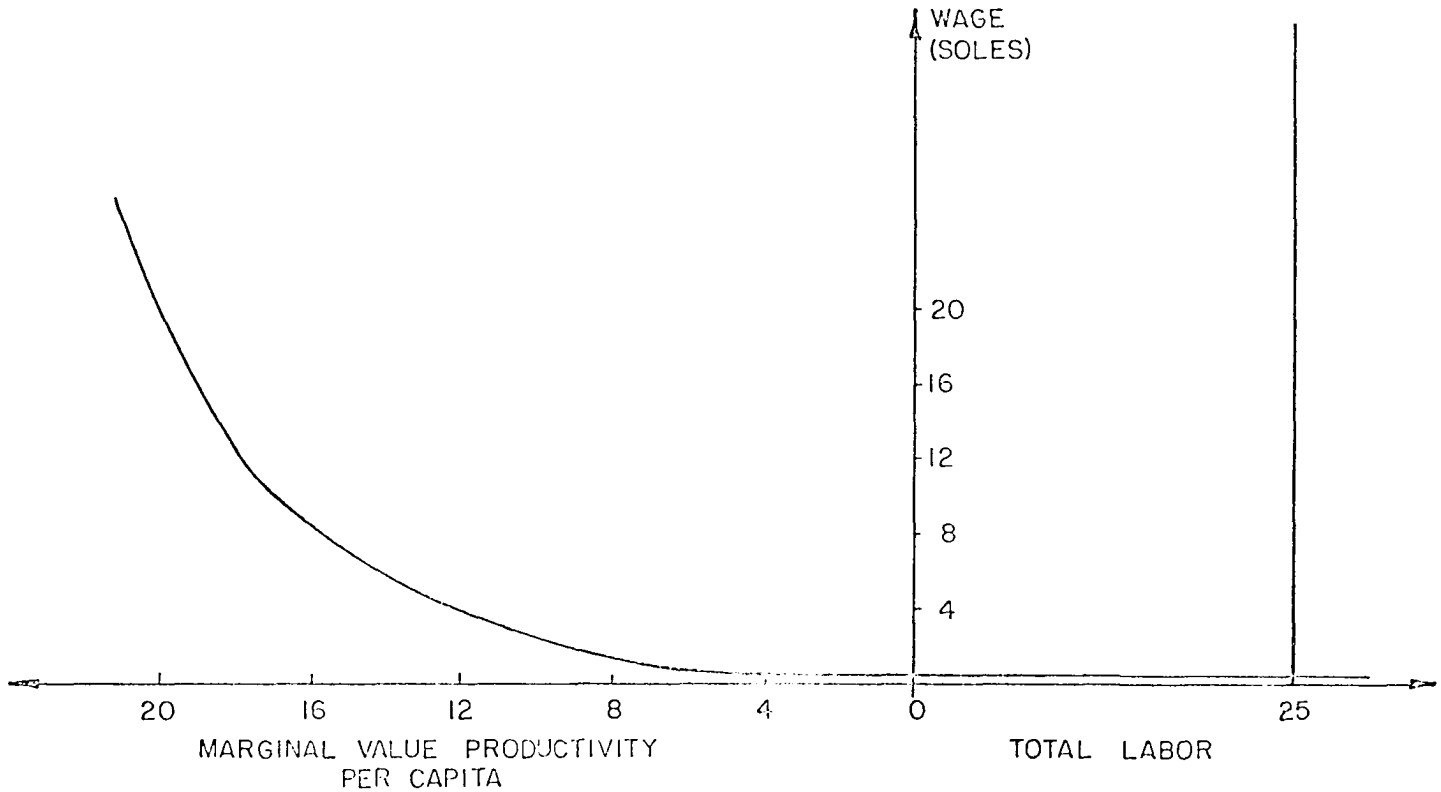

Figure 10. Inelastic supply and productivity of the twenty-five laborers

because of the willingness of the Indian to work more efficiently when he is paid more. The Leibenstein reasoning is that when wages are low, labor is less productive because of a lack of nutrition and sickness, when wages are higher, labor becomes more productive due to better food, improved health conditions which favors the development of intelligence and skills. However, under the Ayacucho hacienda laborers conditions variations in productivity of labor may also be due to unwillingness to work when wages are extremely low and willingness to work more when wages are higher.

The supply of labor is inelastic (Figure 10 assumes an elasticity of zero). Only twenty-five people are used on this hacienda. This does not mean that the twenty-five men will always work at the same productivity level. If they are paid higher wages, they will be willing and able to work more efficiently.

At present, the productivity obtained from the direct work of the laborers can be hypothesised to be S/. 4.00 in a scale of productivity arbitrarily designed in relation to the marginal contribution to the value of the product. Under this framework, when they are paid S/. 0.20, they are being paid below their productivity of S/. 4.00. It is hypothesized that if they were paid S/. 4.00, their marginal value productivity would be S/. 12.00; if they were paid S/. 20.00 their MVP would be S/. 20.00.

Thus, the laborers are paid below their productivity if

they are paid less than S/. 20.00. The marginal value productivity of laborers would decrease as wages decrease, but at a lower rate than the proportional decrease of wages.

The second hypothesis is that Indians on this farm will be able to work more productive land if they pay more rent to the owner. The owner would be willing to rent them more productive land if he receives commensurate rent (Figure 11).

Productivity of land rented for S/. 1.00 an acre by the Indians has a marginal value productivity of S/. 20.00 ceteris paribus. Indians are, therefore, paying a very small sum of money as rent for the land they cultivate. If they would pay S/. 20.00, the owner would be willing to let them work on more productive land, even to S/. 35.00 of marginal value productivity, while if they paid S/. 50.00, the owner would be willing to rent them land of S/. 50.00 marginal productivity.

In formulating the above two hypotheses, the assumption has been made that there are only two factors contributing to production, i.e., labor and land. This assumption is fairly realistic because capital is very scarce; no irrigation is used and fertilizers are seldom used.

For an identification of failure elements of the Ayacucho hacienda, Figure 12 has been designed. Sections A and C of Figure 12 illustrate the situation on the rented land while sections B and D illustrate the situation on the owner's land.

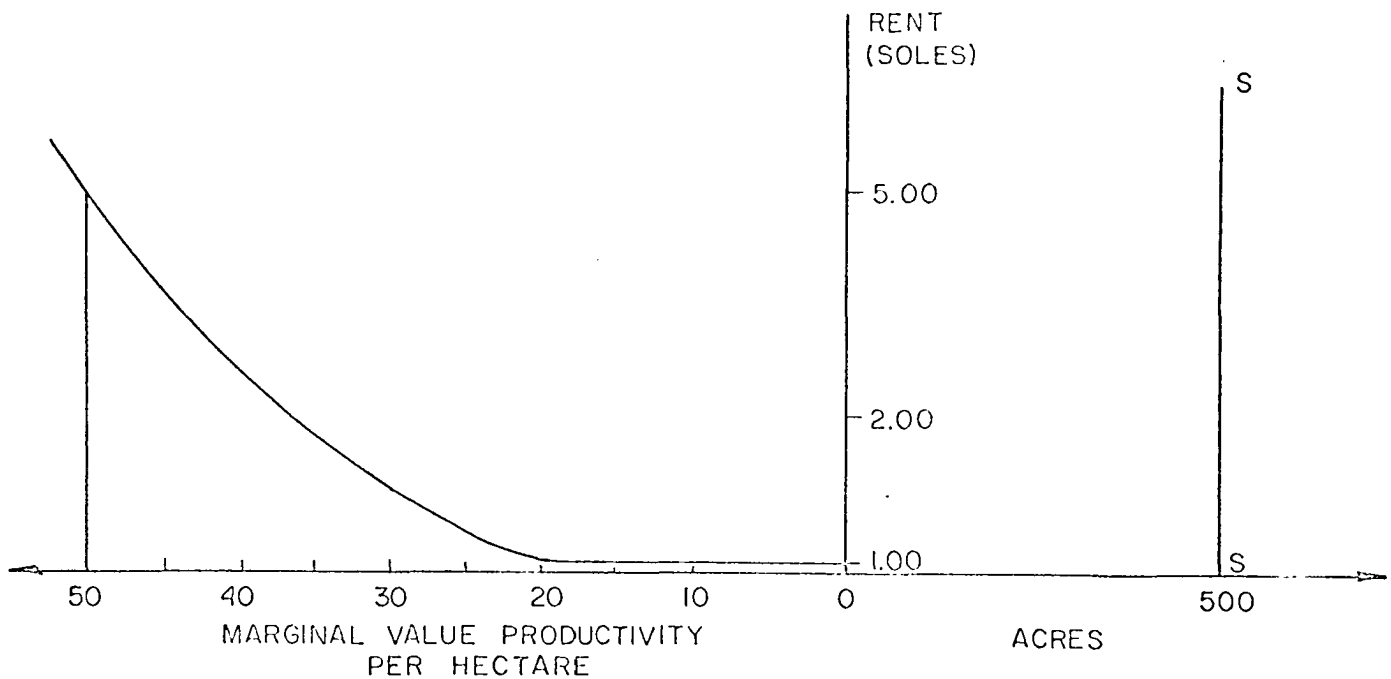

Figure 11. Supply of the lands of the Ayacucho farm

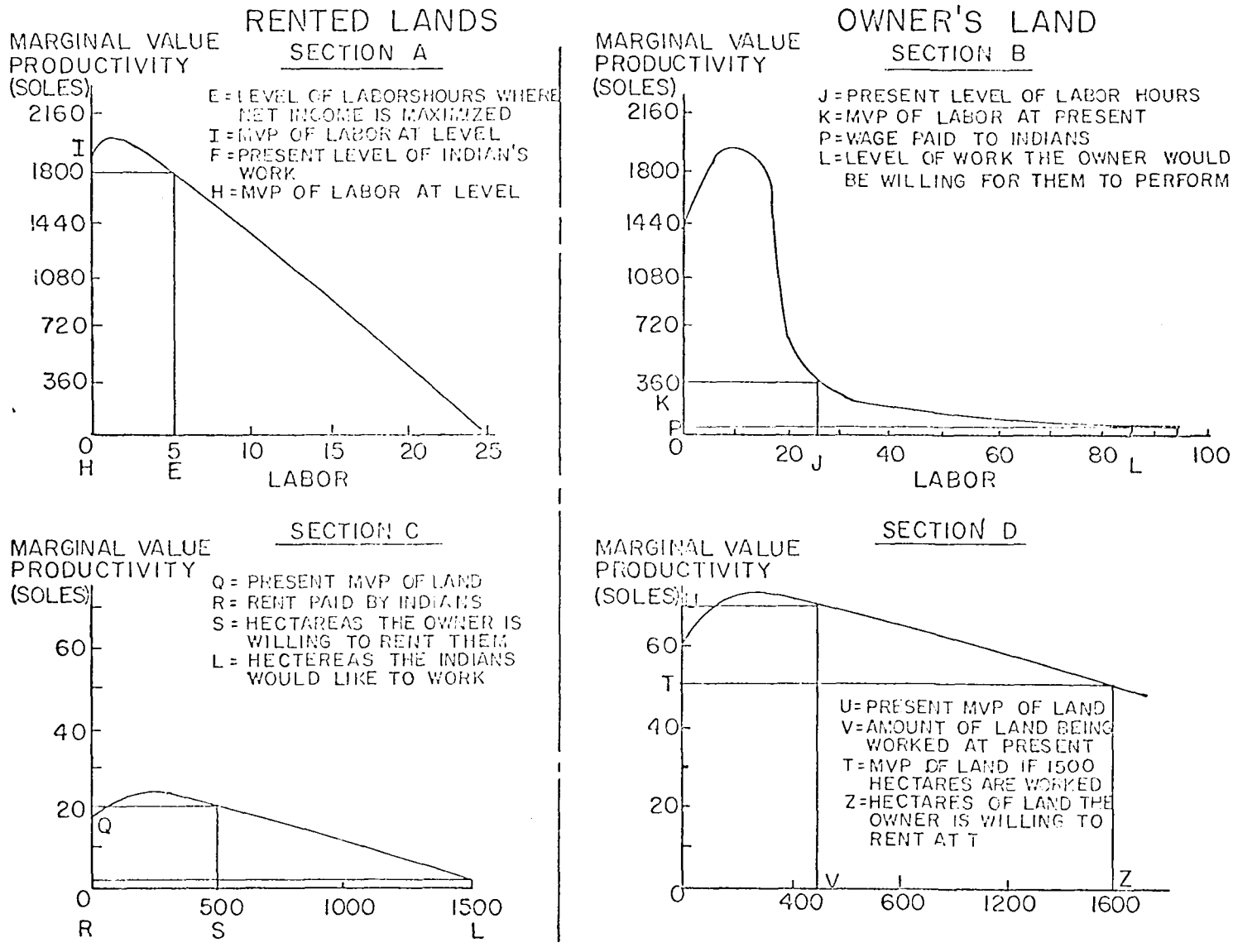

Figure 12. Present situation on the rented and owner's land

Land is held constant: five hundred acres on the owner's land are under cultivation and one thousand acres are lying idle; five hundred acres are cultivated by the Indians in the rented land. Labor is considered as the variable factor.

Under these circumstances, the situation could be analyzed as follows:

Laborers work as hard and as perfectly as possible up to the point where their labor productivity is zero on the rented lands. At this point, they obtain the maximum total product from their labor. At the same time, their quality of work is high so their marginal productivity curve is as shown in section A, Figure 12. Point F represents the level of performance on their rented lands. Point E is the point where they will obtain the maximum net income from their work if wages are compared with wages in other jobs. However, to feed their families, they try to get the maximum total product even though their marginal productivity may be very low. It is important to mention that under the institutional system laborers do not have alternatives for working in other parts because they are mostly isolated in their farms. Increased mobility of Indians would change the above conditions, and this trend is observed in other farms of the region in an attempt to improve the marginal productivity of their labor.

Indians are motivated to work as poorly as possible and at as low a productivity as possible on the owner's lands because the owner is paying them just S/. 0.20 a day. The

hypothesis has been advanced that laborers are producing marginally at S/. 4.00 when they are paid S/. 0.20 (Figure 10) assuming they work ninety days a year. This is also illustrated in section B of Figure 12.

The owner is willing to employ as many as eighty-five of these inefficient workers at this low wage level to maximize his revenue. However, he is limited to twenty-five.

Laborers are paid in cash at levels lower than their marginal productivity. Therefore, they are not willing to work as hard on the owner's land as the owner would desire. This is one origin of problems and conflicts between the owner and the Indians. Conflicts are increasing as the Indians become aware of the conditions of work in other regions of the country, especially in the big cities.

The second analysis holds labor constant and considers land as the variable factor. Indians pay S/. 1.00 per acre for this eroded, unproductive, steep and stony land. Because of this low rent the owner is not willing to rent them more than 500 acres or around twenty acres per person. The Indians would be willing to rent from the owner, 1600 acres of land at the price of S/. 1.00. In the last analysis this means that land is not paid for according to productivity in this category of rented land, because the laborers should be paying S/. 20.00 per acre for the 500 acres rented instead of S/. 1.00. The owner should be getting S/. 10,000.00 instead of the S/. 500.00 he now receives (see section C, Figure 12). Under

these circumstances there is also pressure and conflict between the laborers and the owner, because Indians are asking for more while the owner is not willing to give them more at the low rental payment. Pressure increases when the Indians look at the 1000 acres lying idle each year. They want to rent this land in order to increase their incomes. The owner does not like to rent this land to the Indians because he is sure the Indians would not pay for it according to productivity, since the marginal value productivity of the 1,500 acres of owner's land would be S/. 50.00 per acre. The owner would be willing to rent all this area of land if they were willing to pay him a rent of S/. 50.00 an acre or a total of S/. 75,000.00. Since he does not get this, he just continues with the old system. The owner cultivates only 500 acres, following the old methods, and obtains a total income of S/. 35,000.00 (see section D, Figure 12).

This diagnosis of the problem shows a gap between the ends-in-view and the existing conditions. Factors are paid in cash below their marginal productivity. Also, they are used in such a way that their productivity is low. However, the payment below productivity may not be as great as it appears; Indians are paid S/. 18.00 cash plus S/. 380.00 in rented land. (S/. 20.00 is the MVP of one acre of land and they are given twenty acres. This makes a total of S/. 400.00 less the S/. 20.00 they pay as rent). They pay S/. 20.00 in cash for the rent of the land, plus S/. 342.00

through their labor in the owner's land (S/. 360.00 is the productivity of their work at the owner's land. However, they are paid S/. 18.00 cash. The unpaid labor is therefore S/. 342.00.) The system has inefficiencies and there are bound to be problems between laborers and owner due to the belief each has that he is not being paid according to his productivity. This system makes everybody less productive.

C. Remedial Hypothesis for the Two Farms

Using the principles introduced in the model, we will make an evaluation of the failure and success elements of various alternative structures. We begin with the evaluation of the Ayacucho hacienda. The Ayacucho hacienda offers more failure elements to be corrected than the Cuzco hacienda. Hypotheses for changing the Ayacucho hacienda system to a single rental system and to a system of owner-operators are advanced. Two more remedial hypotheses are introduced under the same frame of analysis seeking to correct inefficiencies.

Before stating the remedial hypotheses, a summary of the conditions found in the Ayacucho hacienda will be presented in light of the model.

The conditions of the individual farms show the following:

I) Resources

(A) Ownership

1) Owned by the policy maker, the Indian farmer
   a) few small tools and oxen with low levels of productivity privately owned by the Indians in addition to their labor.
2) Non-owned by the policy maker
   a) land and land resources privately owned by the owner of the hacienda and given to the Indians for their cultivation and grazing.

B) Class of resources

1) Land and land resources
   a) VI b) below subsistence units, value productivity is about S/. 20.00 per acre
2) Capital resources
   a) wooden plows; 2 oxen and some sheep and goats.
3) Entrepreneurship
   a) bad management due to low levels of education
   b) small part of their time devoted to management
4) Labor
   a) very hard willingness to work on the land
   b) less than 50 percent of their time is available for work on their farm

II) Products of activities

A) Direct productive activities Wheat, barley, potatoes and livestock for consumption purposes.

B) Social overhead capital Almost zero.

III) Variables affecting physical productivity of resources

A) Technology Low levels.

B) Incentives and motivations High incentives.

C) Structures Defective: Land productivity is about S/. 20.00 per acre and laborers pay only S/. 1.00 per acre. Labor productivity is assumed to be about zero because laborers work as hard as possible to feed their family because they do not have other alternatives.

IV) Variables affecting prices

A) Physical variables
   1) Locational attribute originates a small and imperfect market.
   2) Communications with the outside the hacienda are almost non-existent.

3) Transportation to the closest town and to the cities is made by foot donkeys or horses.

B) Economic variables supply and demand forces do not work because of the subsistence level.

C) Institutional variables affecting prices are related to the institutions controlling the small markets which are very underdeveloped.

V) Variables generated in other policy-making levels

A) There is strong influence from the hacienda owner who owns all the land and most of the capital resources used by the farmers.

The conditions found on the hacienda as a whole, which represent the community level, show the variables divided into a double system of owner's lands and rented lands described as follows:

I) Resources

A) Ownership
1) Owned by the policy maker, the owner of the Ayacucho farm.
a) Land and land resources of the community are privately owned by the owner. Part of them are rented to the Indian laborers as part payment for their work on the other part of land which is reserved for cultivation and grazing for the owner.
2) Non-owned by the policy maker
a) Plows and oxen provided by the Indians of the hacienda for the work on their rented land and owner's land.

B) Class of resources
1) Land resources
a) Owner's land; IV; rented land VI;
b) owner's lands worked by the Indians as a group above subsistence cultivated for commercial sales to bakers: 1,500 acres; rented lands less than 20 acres per person on steep slopes.
2) Capital resources
a) Wooden plows, oxen and some sheep and goats

b) on small amounts which could be regarded as almost non existent in relation to the extent of cultivation.

3) Entrepreneurship
   a) Owner's land Bad management due to owners absenteeism and emphasis of work in other enterprises; rented lands entrepreneurship left to each Indian renter.
   b) The entrepreneur or owner devotes 5% of his time to management.

4) Labor
   a) Unwillingness to work on the owner's lands and willingness to work hard on the rented lands;
   b) 50% of laborers time devoted to owner's land and 50% to rented lands.

II) Products or activities

A) Direct productive activities Owner's land mainly wheat; rented lands wheat, barley, potatoes and livestock mainly for consumption purposes.

B) Social overhead capital almost zero.

III) Variables affecting physical productivity or resources.

A) Technology Low levels in both lands.

B) Incentives and motivation Low incentives to work on owner's land because they are paid low wages in cash for the hours they work and the products are sold by the owner: high incentives on the rent land since products are for the workers.

C) Structures Defective since neither labor nor land are paid according to productivity. Labor productivity is assumed to be S/. 5.00 and paid S/. 0.20 when working in owner's land while land productivity is assumed to be S/. 50.00 and rented by S/. 1.00. The owner of the land receives a reward equal to S/. 70.00, greater than the productivity of the owner's land per acre.

IV) Variables affecting prices

A) Physical variables
   1) Locational attributes originate a small and imperfect market.
   2) Communications outside the hacienda are almost non-existent.
   3) Transportation by foot, donkeys and horses.

B) Economic variables Labor supply forces are as indicated in the model for the absentee haciendas; resource market is almost non-existent; product market has a supply which fluctuates during the year according to the harvest time, demand is inelastic on this small wheat market.

C) Institutional factors are the determinants of low prices for the producers especially because of a strong monopoly power exerted by wheat buyers who buy wheat at harvest time and store it for the year.

V) Variables generated in other policy-making levels.

A) Taxation
The community would have taxation power over individual farmers in order to collect a fund to start the SOC within the farm and to keep consumption down for capital creation purposes. Also, some elements of taxation would be included on the stock farmers would have of the cooperative organization. Suggested here is also the improvement of taxation levels at higher policy-making levels.

B) Eminent Domain
Would be mainly generated a higher policy-making levels than community level. However, after some years of work the community may exercise a strong activity in balancing the efficiency of cultivation by buying inefficient land and distributing it through the other owners.

C) Police power
Would not be exercised by the community level but it may be responsibility of higher policy-making levels.

D) Spending Power
This could very well be exercised by the community policy makers, mainly to increase SOC of the community.

E) Proprietary Power
Most of the land property would be individually owned by farmers. However, some land could be owned collectively by the community especially for grazing purposes.
Many of the tools and machinery may be owned cooperatively by the community and also by other governmental agencies at other levels of aggregation.

This double system creates inefficiencies in the use of

resources and ability of Indians to improve if rented lands are considered separately as distinct sections of the farm. Variables are not combined structurally on the best possible way. The following hypothesis investigate some other possible structural arrangements to improve the situation.

1. First hypothesis: Single System

The first remedial hypothesis stated is the elimination of the double system of rented and owner's lands. The first obstacle to attain the goal or norm would be eliminated if a system of a single cash rent for the farms within the hacienda is adopted in which the factors would be rewarded according to their productivity.

In order to study the results of this hypothesis, a reallocation of resources is considered. The 1,500 acres, the owner's lands, will be subdivided and rented to the twenty-five Indian families in such a way that the rent will be equal to the marginal value product of land. It is assumed that labor of the rented lands will be transferred to the good land (owners' land). Quality of labor will be as efficient as laborers perform on their own plots.

The first adjustment to be made for the analysis is to convert land and labor to units of same quality. One unit of labor on rented lands will be considered as a standard unit of labor after adjustment in the system is made, and one acre of owner's land will also be considered as a standard

unit of land. Labor on the owner's land will be regarded as 0.2 standard units of labor (estimated from its productivity), so twenty-five men working on the land under the old system will become just five standard units. The same will be the valuation of one unit of rented land so that 500 acres will be considered only as 200 standard acres. This example is suggested in order to speculate on what would happen if the system were varied.

Figure 13 illustrates how the total value product obtained from the rented land was S/. 11,800 while the total value product obtained from owner's land was S/. 35,000.00. The first figure was obtained with the use of 200 standard units of land and 25 standard units of labor, while the second figure was obtained when 500 units of land were used with the equivalent of 25 standard units of labor. With the help of the adjustment to standard units, it is possible to illustrate the marginal rate of substitution of labor for land at each level of application of these units and this is illustrated as a hypothesis in Figure 13. This also suggests what the result would be if 25 standard units of labor were applied to the 1,500 acres of owner's land if no other change were to occur.

The marginal value productivity of labor and also the marginal value productivity of land would be higher than before with the application of the better kind and quantity of labor to good land instead of the steep poor areas. (See

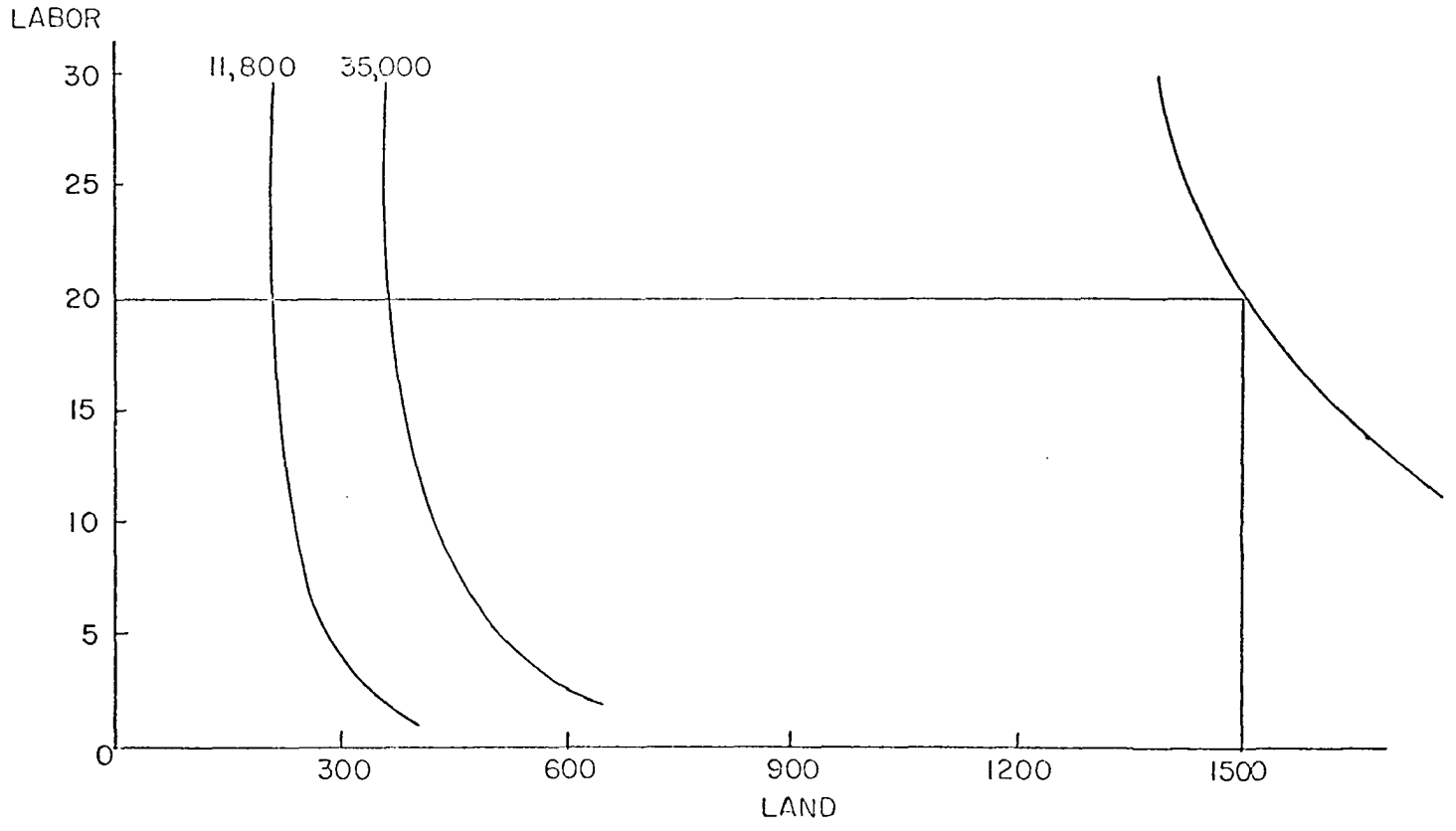

Figure 13. Labor-land relationships and total value product

sections A and B of Figure 14). Therefore, the marginal productivity of labor would be S/. 20.00 a day (S/. 45,000.00 a year for the twenty-five laborers), while the marginal value productivity of the 1,500 acres of land would be S/. 70.00 per acre or a total of S/. 105,000.00 for the total area. This makes a total of S/. 150,000.00 of total production if this arrangement is established on the 1,500 acres of owner's land without even cultivating the areas which at present are being rented by the Indians. The income of the Indians would go up from the S/. 398.00 they were paid before to S/. 1,800.00. Since they would be renting the land, they would pay the owner according to productivity, which means they would be paying S/. 70.00 per acre for land to the owner. The owner would obtain a total of S/. 105,000.00 of cash payment, instead of only S/. 34,950.00 as in the old system.

The same results would be obtained if, instead of renting the 1,500 acres of his lands, the owner would like to manage it by himself and pay the laborers according to their productivity. Under this arrangement, each laborer should get S/. 1,800.00 for his work. However, this would create disadvantages. The Indians would be restricted in their freedom to do the job as they want and, therefore, they would not work as well as they do by themselves. We are assuming here that the owner does not give effective leadership and also that his technical level is very low. There

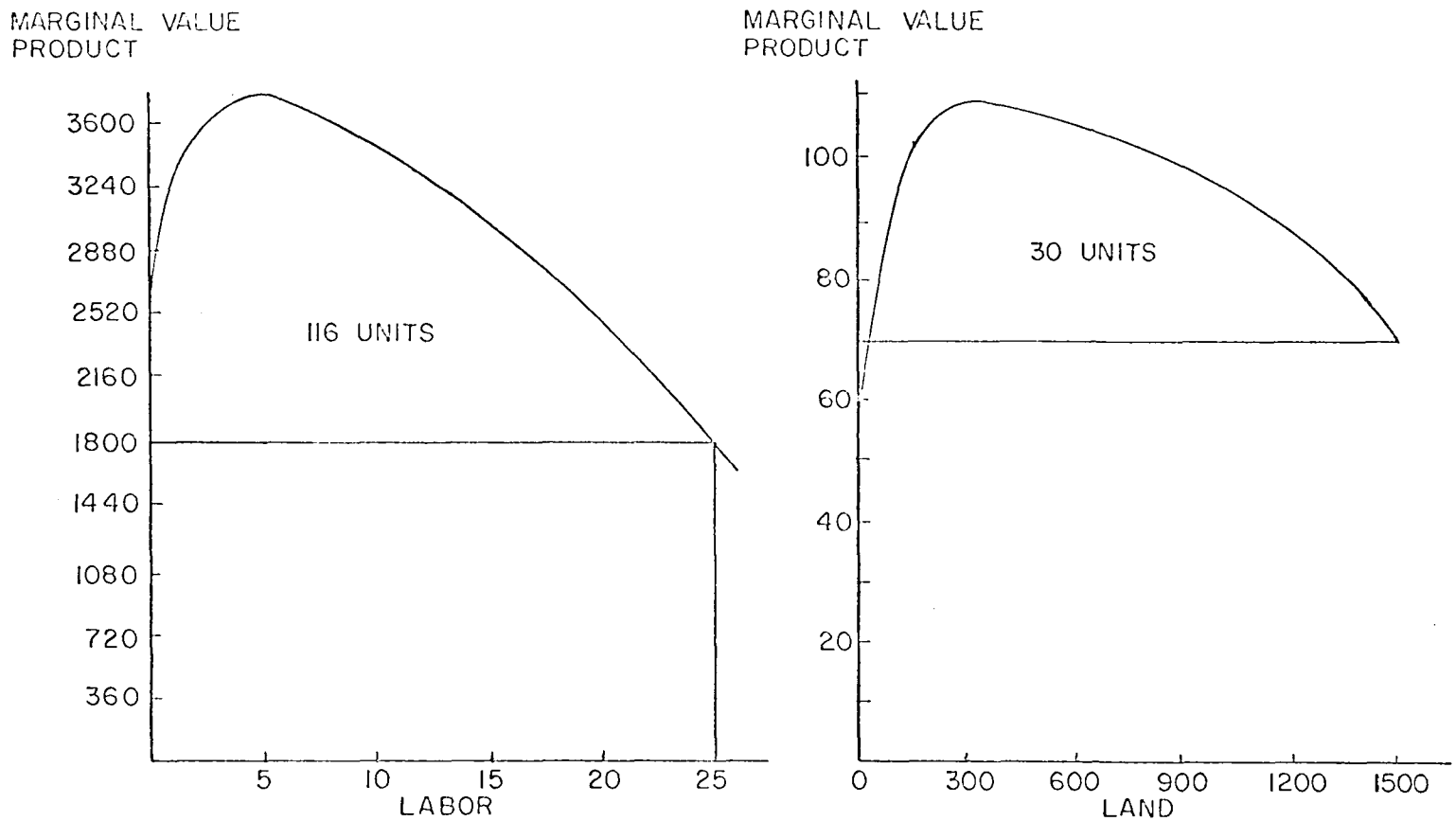

Figure 14. Marginal value productivity of labor and land under rented conditions

would also be some social pressure because the Indians would be working under the orders of someone else and they would not be able to perform and perfect their managerial abilities. This is why we reject this hypothesis as inferior and give more credit to the rental hypothesis at present.

Let us now examine what are the required conditions for this cash rent to form a perfect leasing system when all the factors are paid according to their productivity. This will bring us back to the concept of imputation and the Euler theorem. The total physical product (TPP) or the total value product (TVP) can be broken up into share such that the reward to each factor is equal to its marginal value product. The other assumption is that the elasticity of production is equal to one, because this is the only point where there is exhaustion of the total product. When elasticity of production is one, the average physical product (APP) is the maximum. The imputational procedure then, using Dr. Heady's formulas (18) will be:

$$RL = V - \left(\frac{P}{P}\cdot\frac{\Delta P}{\Delta C}\cdot C \div P_p \cdot \frac{\Delta P}{\Delta M}\cdot M \div \frac{P}{P}\frac{\Delta P}{\Delta S}\cdot S\right)$$

or

$$RL = V - (P_c \cdot C \div P_m M \div P_s \cdot S)$$

RL = Residual return to labor
V = TVP
C = Capital
M = Management
S = Land
L = Labor
P = Price

The main element which makes this single system different than the double system studied before is that it can no longer be regarded as a community but a conglomerate of individual farmers renting their lands and working alone not in association with the others. Therefore, it can be compared with the individual farms of the Ayacucho Hacienda as follows:

I) Resources

A) Ownership
1) Owned by the policy maker, the individual farmer.
a) Same tools and oxen as in the previous conditions.

2) Non-owned by the policy maker.
a) Land and land resources privately owned by the owner of the hacienda and rented to the Indians.

B) Class of Resources
1) Land and land resources
a) IV;
b) Unit would be above subsistence and operated for commercial purposes by each Indian: 60 acres.
2) Capital resources
a) Same resources as in the previous conditions.
3) Entrepreneurship
a) and b) Same conditions as in the previous case.
4) Labor
a) Very hard willingness to work on the land.
b) About 100% of their time would be devoted to farming.

II) Products or Activities

About the same conditions as in the previous case.

III) Variables affecting physical productivity of resources

A) Technology Low level.

B) Incentives and motivations High incentives to work for their families and increasing profits.

C) Structures Non-defective since they pay according to productivity of the land. Marginal productivity of labor will be S/. 20.00 a day or S/. 1,800 per year per 90 days. The owner of the land would get S/. 105,000.00.

IV) Variables affecting prices

Same conditions as in the previous case

V) Variables generated in other policy-making levels

There would not be any influence of the hacienda owner upon each farmer and there seems not to be any strong influence from the outside upon them.

2. Second Hypothesis: Shifts in Ownership to Family Farm Owner Operated

This section is the study of other means for increasing the labor productivity. Rewards may be paid according to productivity in the first hypothesis, but laborers would still have very low income in relation to the needs for subsistence.

What would happen if instead of renting the land from the owner, laborers bought it and cultivated their own land? Laborers would get the marginal value product of land of S/. 105,000.00, which is around S/. 4,200.00 per laborers, plus their wages for working in the land plus management rewards. This amount added to the S/. 1,800.00, or their productivity, would add up to S/. 6,000.00. This is a considerable increase.

How would they have to pay for the farm and how would they raise the money to buy it? After redistribution, land would cost S/. 1,050.000.00 if we consider the marginal

productivity of land as ten percent of its total value. This would mean that Indians would have to pay S/. 42,000.00 per share and they would be able to pay this in ten years. However, it seems reasonable for them to pay according to the farm's productivity at the time of the purchase, when the systems of cultivation were deficient. Productivity was S/. 35,000.00 (S/. 70.00 x 500 acres cultivated per year), therefore, land would have a value of S/. 350,000.00 at the redistribution period. Indians would pay S/. 14,000.00 per capita. Assuming this were paid in twenty years, they would have to pay only 700.00 per capita per year, plus interest. The result would be that the income obtained by the Indians would go up to S/. 6,000.00 - S/. 700.00 S/. 5,300.00, a substantial increase over their present income. The owner would receive a total of S/. 17,500.00 a year for twenty years.

Under this system the new owners would also be working alone individually and we could not think of the existence of a community. The main difference with the previous system is the ownership of resources. Under this system Indians would have a plot of land of their own and they would cultivate it by themselves. Would this be the best system or better system could be found? In order to have a clearer answer to this question, failure and success elements in terms of the end-in-view of increase in income and productivity of the farmer should be examined. Failure elements found are 1) lack of technological knowledge, 2) uncertainty of the

outcome, 3) lack of substitute patron, 4) lack of entrepreneurship and leadership, 5) inflexibility in size of the unit, 6) indifference of the owner to social ends, 7) isolation from civilization, 8) lack of credit facilities, 9) market inefficiencies, 10) lack of physical facilities, 11) fixed habits. Success elements are 1) provision of incentives to work, 2) no basic change in structure, 3) security of expectations, 4) less bureaucracy.

a. Failure elements of the Second Hypothesis

1) Lack of technological knowledge. In order to increase their productivity curve, Indians need to improve their technology. They will be faced with the problem of how to change methods of production, how to cultivate other more productive crops, how to fight the pests and diseases, which are the best periods for cultivation of different varieties, which are the best varieties for the altitude, the environment and the precipitation of the zone, which are best levels of fertilizer application, how resources can be organized more efficiently from the economic and physical point of view.
2) Uncertainty of the outcome. They would not be willing to change methods because of the uncertainty of the outcome. There would be a kind of uncertainty aversion. If Indians were more educated, the uncertainty could become risk. Uncertainty is responsible for the inefficient use of labor and the deficient crop pattern.

3) Lack of substitute patron. William W. Stein (40) describes as follows the relationships between Indians and patron:

> One very great advantage of the peon-hacendado relationship, which has not yet been mentioned, is the protection which the mestizo patron may give to his Indian peons. Some of the landholders of Tactabamba are not very powerful mestizos: others are close to the top of the Carhuaz socio-economic hierarchy. But any mestizo is better able to obtain justice than an Indian. The mestizo is able to do business in Spanish and to understand legal processes. The Indian is disparaged because he is an Indian. Moreover, there is a certain broad solidarity of 'mestizones' as opposed to the Indian social category. If a legal problem does not involve a more powerful person or a social equal, the mestizo is more likely in general to receive a judgment in his favor. The peon, therefore, receives a certain amount of protection from his patron, if it does not conflict with the latter's interests. The patron intercedes for his peon before the law. The patron may make arrangements with the local equivalent of the draft board to keep his peon out of the army. The patron may apply pressures on local and town authorities to exempt this peon from participating in/ or contributing to the local tributary labor organization.
>
> One significant aspect of the role of the patron, is his position as gratifier. A good patron will take care of his Indians, will feed them well and give them gifts. An Indian will in turn give his patron small gifts to win his favor and recognition .....Many of the people of Monus are content with their dependence. This is not only a matter of the economic situation but seems to involve personality characteristics.

It is important to keep these concepts in mind when changes in ownership are being considered. There may be a decrease in productivity and in the development of the Indians if a substitute patron is not offered to them for some years while the transformation is being made and later, until the Indians can be self-sufficient. As a result of lack of owner or patrons advice, Indians may decrease productivity. They may lack seeds for planting, money for acquiring some small tools to

to work with or ability for selling their products in the market. A substitute patron may be needed for a certain period of time to make adjustments. The patron may be replaced by a different organization established to insure efficiency of operation among the Indians.

4) Lack of entrepreneurship and leadership. Indians are not used to performing activities by themselves. At present, they do not appear to have the innovator's ability which would lead them to the creation of new systems of cultivation and a different arrangement of the product mix. Indians are not sufficiently educated to perform these activities by themselves. Market information cannot be given laborers to be used in redirecting their production activities.

5) Inflexibility in size of the unit. As technical knowledge increases, capital grows, education improves and uncertainty decreases, the efficient size of holdings changes. Family farms would present the problems of inflexibility in size. At the beginning the size could be set up as an economic unit, but later on the increase in population, inheritance laws, and other factors could turn it into a non-economic unit. Economic unit is defined here as a holding whose size (resource content) makes it capable of producing an output comparable to a family income norm derived from the policy maker's preference function which reflects the utility or wants of the society.

6) Indifference to social ends. Growing out of the

Peruvian psychology this arrangement would originate indifference of the new-owner to social ends such as resource conservation. It would tend to encourage land speculation, especially if there are not alternatives of investment other than the purchase of land.

7) Isolation from civilization. There are no highways going to the farm except a horse road. This fact makes it impossible for the Indians, if there were educated, to read papers or hear news about what is happening in the outside world. They could listen to the radio but the stations are not sufficiently developed in the area.

8) Lack of credit facilities. Capital would be one of the more limiting factors in the process. According to the Ayacucho farm and Cuzco studies Indians do not borrow from the agricultural bank. During the survey it was found that Indians do not have precise knowledge of the existence of the bank and its functions. Under these circumstances and because of his being unaware of credit possibilities, the Indian is not able to expand his production or to buy seeds and other supplies for cultivating his plot of land.

9) Market inefficiencies. Indians sell their products mostly in small local markets. In the Ayacucho market, wheat is sold to local bakers mostly during the harvest period. Wheat supply is very inelastic since the Indians want to obtain their money rapidly at the time of the harvest and the

bakers are the ones who buy wheat at that time to use it slowly during the rest of the year. Thus, when there are great quantities of wheat in the market around June and July, the price is very low. The Ayacucho wheat market is an isolated closed market because of the lack of transportation and the lack of knowledge of prices in other regions of the country.

10) Lack of physical facilities. The Ayacucho hacienda lacks running water, either for cultivation or for drinking. Indians have to walk down to the river about 1000 feet below to get water. There are no telephones or mail service and transportation is very primitive. There is only a horse road to the city of Ayacucho. Houses of the laborers are very poor since their single room is used for kitchen, living room, dining room and barn for an average of six people including four children. If the children remain with their parents, they would have to cultivate increasingly smaller plots and their marginal productivity would decrease.

11) Fixed habits. Indians chew the leaves of "coca" which act as a stimulant but causes a reduction in physical and mental responses. This stimulant which is consumed in great quantities by the Indians is one factor among many others that causes the tardiness, melancholy and passivity that predominates in almost all the Indian population. Frequent festivities give Indians an opportunity to spend savings on alcohol and fireworks. On the Cuzco farm we found that alcohol consumption increased as income increased (See Table 8).

b. Success elements found in the second hypothesis

1) The redistribution into family farms might induce incentives to work efficiently since the output would be sold and utilized by the same operator. The marginal value productivity curve would be increased because of willingness to work harder. This has been illustrated in Figure 3 as the MVP_2.

2) If titles to land are transferred with some security to the Indians their expectations would increase and their planning horizon will be greater. This would decrease tenancy uncertainty but it would not necessarily decrease other types of uncertainty such as weather.

3) The government would not have to increase its services to control the amount of land held by each one of these farm families. No inefficient bureaucracy would be created to decrease efficiency of operation.

3. Third hypothesis: Government-owned land given to the operator for his production

Under this hypothesis, it is assumed that the rest of the economy is already nationalized. This means that the government owns the processes of production: it obtains the products and distributed the income among people according to their marginal productivity and also takes care of the poor and of people unable to work. In other words, we are

talking about a completely controlled economy. With regard to farming, this institutional arrangement would involve the distribution of land among workers, leaving them alone in the management of the holdings but exercising control over the output obtained from the producers and distributed by the government to transforming industries. The farmer would be paid in good and facilities for his daily living. His level of living would then be in accordance with the total productivity of the farmers.

Conditions under this system could be analyzed only from a community point of view since the land would not be divided into individual farms but all the people would work at the hacienda as if it were one single unit.

Conditions of the variables could be outlined as follows:

I) Resources

A) Ownership
1) Owned by policy maker, the government
a) Land and land resources and capital resources publicly owned by government
2) Non-owned by policy maker Nothing.

B) Class of resources
1) Land and land resources
a) IV and VI
b) 2,000 acres of land, the whole Ayacucho hacienda
2) Capital resources
a) and b) kind of capital resources and availability may improve according to the allocation of resources made by the government and the increase of capital in the whole nation.

3) Entrepreneurship
   a) Would improve if a manager would be assigned who would have more knowledge and some incentives for doing a rapid job.
   b) The percentage of his time for this hacienda would depend on the decisions of the government.
4) Labor
   a) Labor would work as a group in the whole farm in a similar way as it is presently done on the owner's lands and their efficiency could be increased according to the motivations and incentives given. They would not be owners.
   b) The number of laborers could vary according to the decisions of the policy maker.

II) Products or Activities

A) Direct productive activities
Could be accommodated to the needs of the people of the nation and to the possibilities of production of the area.

B) Social overhead capital
Depending on the needs and capacities of the economy social overhead capital could be invested on the hacienda to improve its productivity.

III) Variables affecting physical productivity of resources

A) Technology could be improved depending on the improvement of the nation's technology and the plans of the government.

B) Incentives and motivations would depend on the ability of the government to provoke motivations.

C) Structures would not be considered deficient if the government makes an allocation in relation to productivity of the farm and of the nation.

IV) Variables affecting prices

Prices would not be important under a system of controlled economy.

V) Variables generated in other policy-making levels

There would be a strong influence from other policy-making levels which would directly affect the conditions of the hacienda.

The analysis of this system suggested that the main failure elements are: 1) increase tenancy uncertainty, 2) change in the political and social conditions of the country, and 3) some other failure elements found on the third hypothesis. The success elements are: 1) size flexibility of the holding, 2) efficiency through premiums, and 3) easy redistribution of profits.

A. Failure Elements

1) Tenancy uncertainty would be increased since the government could change an individual from one given place to another if he was not efficient in his previous work. The farmer would not feel secure. This tenure uncertainty would depress the MVP of labor to low levels. The losses would be greater if there is an unstable political climate.

2) The Peruvian executive government and congress is elected through general elections by all the Peruvians. However, more than one-half of the population is illiterate and according to the constitution cannot vote (during the 1963 election only literate citizens voted); therefore, government and congress are representatives of only one part of the population. As a consequence, assuming congress has a voters preference function, congress would work mainly for the welfare of people who elected them. However, every six years a new government is set up. Peruvians who are discontented with a given government are able to express their feeling

through elections. Under the institutional arrangement we are discussing, there would be no possibility for Peruvians outside the government to decide their future through elected representatives. Theoretically this implies that the preference functions of the government elite would be imposed on people. In the present system, the utility function is expressed by one-half of the people. Under the present organization of the western world, an institutional arrangement like the one we are discussing, would mean a change in the traditional beliefs of people and the freedom they are accustomed to and a change on the monetary, social and economic arrangement of the government. The farmer would have to change his traditional ways of thinking and behaving. All of this could mean a decrease in productivity.

3) There are also some other failure elements already discussed under the family farm owner operator whose effects do not seem to be different under the government owned lands if supplementary activities similar in both cases are not undertaken. They are lack of technological knowledge, uncertainty of the outcome, lack of managerial ability, isolation from civilization, lack of credit facilities, lack of physical facilities, high population growth, fixed habits, lack of popular action.

b. Success Elements

1) Size flexibility of the holding. As capital goods would be increased in the nation as a result of economic development and the farmer would start receiving more machinery for his work, he might change methods of production. The optimum size of holding according to proportionality effects, would increase. Obviously, the extent of the flexibility of size change would not be limited, but the limitations would be smaller than in family farming.

2) Efficiency through premiums. Since there would not be incentives for a greater production under this third hypothesis of government operated lands, the productivity of labor might become as low as in the case of the owner's land. There would be two methods for providing incentives: to force the farmer to produce a given amount from his plot or else his plot would be given to another more competent person; to offer premiums on his share of the national income if he produced above a given level of yields. This level would be predetermined by the government in each given locality.

3) Easy redistribution of profits. Under the system we are discussing, redistribution of income could be attained at various levels through central distribution of products and central planning of production processes. They would decide which are the most important distributing goals and they could direct their policy means toward those goals.

4. Fourth Hypothesis: Creation of Communities with Local Government

A structure is suggested here as a consequence of the analysis of the above three hypotheses. The structure suggested has the characteristics outlined below through the relationships of variables at the farm level. It is based on the creation of individual land holdings for cultivation, the grouping of farmers in communities or local governments and the help of the other governmental levels whenever it is necessary. Variables could be related as follows:

I) Resources

A) Ownership

1) Owned by the policy maker, the Indian farmer.
   a) Land and land resources, but with restricted rights. They would obtain the rewards for the use of land resources and also of other capital resources they may be able to provide.
2) Non-owned by the policy maker.
   a) Resources provided by the community as a form of credit unions.
   b) Extra amount of capital resources provided in the form of credit and extension work according to their needs and to countries convenience and need, and through other aggregational levels of policy-making.

B) Class of resources

1) Land and land resources
   a) IV and VI.
   b) Availability per family would vary according to the needs of the farmer through the year. It could increase by a redistribution of badly worked lands to farmers who need more land because of an increase in resources and efficiency of cultivation.

2) Capital resources
   a) and b) Most important capital resources for production would be available through provision of the government according to the possibilities of the region and nation.
3) Entrepreneurship
   a) and b) The manager would be the same farmer giving all the necessary time to this endeavor. However, his work would be improved by the action of the community government and advisors.
4) Labor
   a) Labor would be performed by the same policy maker the Indian farmer would have the incentives of the ownership of the land resources.

II) Products or Activities

A) Direct productive activities would be planned according to yields, needs of the region, markets and better use of resources.

B) Social overhead capital. Needed SOC could be performed by himself with the help of advisors to the extent that it concerns to his farm. However, if it also concern to the welfare of the community the members would help him perform this type of work.

III) Variables affecting Physical Productivity of Resources

A) Technology Would be increased to the best known techniques of the region and it would depend on the evolution of the community and their relation with the outside technology attained in the region.

B) Incentives and motivations Would be high since they would obtain the marginal value productivity of land; they would also be helped to increase productivity of land, labor and capital and increase the amount of capital they have by the action of the community.

C) Structures Would not be defective since it could be improved by the governmental action or legislation whenever it is necessary. Land titles would be given to the farmer. However, if land is not is not efficiently cultivated for a period of years according to minimum standards set up for the region, land could be expropriated and given to the community for redistribution.

IV) Variables affecting Prices

A) Physical variables Through community action locational attributes would be improved through the creation of better systems of transportation and communication; also storage facilities would be created for the protection of individual farmers.

B) Economic variables Supply and demand variables would be identified by the national or regional authorities and prices may be controlled if needed. Farmer would market his products through the community and also would buy resources through this channel.

C) Institutional variables The monopoly power of certain institutions would be removed through the cooperative organization of the community. Other monopolies which cannot be controlled by the community could be offset through regional and national cooperative associations and through the working of other policy-making levels.

This arrangement would be formed after land is sold or redistributed. A given standard of efficient production would be set up for the area where the Ayacucho hacienda is located. This standard could change as time passes and could be designed with the help of a cadastral system and soils mapping of the country. If the owners did not meet the productive standards, the government would have the right to redistribute their land. Care would be placed in letting the new owners have a sufficient planning horizon so that they would be sure about the rewards from their investment. If the farmers obtained a higher level of education and more capital improvements permitting them to farm a bigger amount of land, under the fourth hypothesis, the government would be in position to give farmers some extra land, increasing their supply through

further redistribution of inefficiently operated lands.

The flexibility of the system is very important so that the units would be of such a size that the operator could increase his productivity on an efficient scale. Transfers would be important and a system would be designed in which it would not be difficult to make them.

a. Failure Elements

1) The main failure element would be the relative unfeasibility of this system. Some people would be opposed to this system, especially the big hacienda owners. However, structures are means for achieving the ends of society. If these means are against the attainment of the ends of society, they could be changed.

2) The freedom of people would be decreased considerably in relation to their property rights. They would be engaged in activities in a joint ownership with the government and inefficiencies of the government would affect them. There would be conflicts between their interests and governmental interests.

3) The government would need more well-trained and prepared people. However, it could plan a program of training to teach the employees to perform these activities in a future well-balanced operation.

4) The planning horizon of the government would be small. Every six years an election would change the representatives

and the whole government. If the new government wanted to change the policies, it would change all the plans of the previous government. Therefore, all the adjustments made could result in nothing. It is difficult for a democratic government with a regular change every six years to have a plan of action of this sort with a large planning horizon.

b. Success Elements

1) Capital would be allocated according to a given plan which would be adjusted to attain the ends of society in the shortest period. If the government received some help from international institutions through loans at low interest, this money could very easily be used by the government in buying input elements for the farm industry.

2) Coordination and supervision could be exerted by the government in such a way that the lack of knowledge of technologies of the individual farm would be overcome.

3) Incentives to work would be provided. The operator would know he was working for his own good on his own land.

4) The flexibility of the unit is important. This would exist as explained before.

5) Diversification could be attained if needed by the government planning and counseling to the farmer. The patterns of crops could be planned in each area as well as the amount of each product needed in a given market.

6) If a local government was provided, it could also work to

provide the community unit with highways and irrigation as needed in a popular action frame of work. The government would give tools and resources to the laborers for their more efficient work and would benefit from these actions because it improves the Social Overhead Capital. SOC could be provided at very low prices if this system of work is adopted. 7) The marketing ability of the unit would be greater and a change would be made from the poor, small and inefficient markets to national and more advantageous markets. If this change is planned and carried out by the government, there would be no danger of the prices going down. The marginal value productivity would not be decreased because of prices. 8) Uncertainty of the outcome would be decreased because the government could be more certain due to the experience and volume of its operation than a farmer who cannot have a greater vision than his farm and this nearby market.

Thus, among the four hypothesis, the fourth offers more success elements and combines exogenous variables in such a way that they may be manipulated with greater flexibility to attain the ends-in-view through the working of the model or the structural relationships of variables.

V. REFORM OF EXISTING STRUCTURES

The analysis of the two case studies and the identification of the elements of success and failure of various alternative situations provide the partial basis for an understanding of the importance of an agrarian reform in Perú. As hypotheses coming out of the study and mainly applicable to the conditions found, some suggestions are made of criteria for the reform of the haciendas and the constitution of the communities.

A. Criteria for Reform of Existing Conditions

The criteria for reform and creation of new units under the community system would be: 1) priorities of affectation, 2) cadastral system, 3) appraisal of land and other resources, 4) system of transferences and titles, 5) system of payment, 6) individual rights, 7) stages of creation of the new ownership system.

1. Priorities of affectation

The first criterion for starting the reform would be the political stability. Political stability is a factor influencing and being influenced by economic development of a nation and also is one of the motivating forces for making the reforms. Redistribution based on the criterion of political

stability may have to be fast and it may not be perfect because of its urgency, lack of planning and time, but it creates short run stability. It is important, however, to proceed with very flexible commitments on this kind of reform. Redistribution could be improved later if the plans were flexible instead of definite measures.

The second criterion is economic development. Haciendas would be distributed which provide greater marginal value productivity of the investment. This may be the case of absentee-owner haciendas similar to the Ayacucho hacienda. The new owners could increase the size of the plots they are cultivating at present as occurs in the Ayacucho hacienda.

The third criterion is the applicability and economy of the process. The state-owned lands, the "beneficencia" lands, municipal land, university, and other kinds of public land would be more amenable to redistribution because there might well be less frictions between these owners and the Agrarian Reform Institute. The Agrarian Reform Commission Report (28) and the new project of law currently under discussion (35) place these lands for total affectation; this law would provide for transfer of this land to the Agrarian Reform Institute.

The next criterion would be the redistribution by private initiative. This kind of redistribution might become very common when the reform is underway. Many people would be both more willing to sell their lands and to sell at lower

prices as reform gained momentum. Presently, there are transfers being initiated on lands owned by the church, and by some United States corporations properties. The cost of transferring these lands to the government would be reduced since owners would divide up the land among the buyers, following the directions of the Institute of Agrarian Reform. This type of reform could be encouraged by exempting private owners from transfer taxation if required.

The next priority would be to redistribute well-organized haciendas which do not permit laborers to improve their living standards. This is especially important in the coastal farms.

2. Cadastral system

The establishment of the new units needs to be accompanied whenever possible by the establishment of a cadastral system. It would be desirable that each unit of new farms be registered on a cadastral system. The first areas to be included in the cadastral survey would be the areas where the redistribution starts. The maps could be drawn from serial photographs at suggested scales of 1:50,000 to 1:75,000. A good description of a cadastral system is given by a FAO study (7:). It shows the effectiveness of cadastral surveys as a foundation of the best management and the use of land needed for the improvement of human life. It states

the following:

> No está fuera del alcance, ni siquiera de un gobierno relativamente pobre el levantar mapas de sus territorios y establecer un registro de propiedad rústica. Los gastos realizados en dichos trabajos se veran compensados con creces.[1]

The cost of cadastral survey according to the United States estimations is around 0.25 cents (U. S. dollars) per hectare. Less than one cent is spent for serial photographs, 0.2 cents for the copies, and the rest for the work of the experts (8). The maps need not be of vertical topographic data. Actually, they could be only contour maps of the farms, not specifying even the details of the inside of the farms. It is advisable, however, to insert the topographic details or any additional information needed. It may be important to include ecologic and soils data. If the survey is of new lands, it is more important to stress the physical aspects of the new lands. If it is of cultivated lands, the social-economic conditions should be stressed.

The cadastral survey will be used for determining the size of the new units, registering the titles in easily identifiable framework, creating the geographic units, identifying any change in tenure systems occurred. It would eliminate some of the conflicts among land owners found in Perú,

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[1] A free translation is as follows: "It is not outside the scope, not even of a relatively poor government to draw maps of its territories and establish a registration system of farm property. The expenditures of these types of tasks would be rewarded profitably."

especially those arising from title insecurity and unknown boundaries.

3. Appraisal of land and other resources

There is much stress on the role of land in the Peruvian environment. It is important to make an appraisal not only of land but also of other resources of the farm. The redistribution should avoid the flight of machinery, capital and other productive resources used at the farm. Appraisal for transference would therefore include land and other resources being used for farming.

The Bolivian Agrarian Reform of 1953 and the Cuban Agrarian Reform legislation in 1960 provided for the payment of land to be redistributed according to the stated value of the farm at the "Registro de la Propiedad Inmueble". This has the advantage that the law offenders (the owners who had their lands under-valued in the present system) would be punished by receiving a smaller amount of payment for their lands. This in a sense could be considered justified if we note that by not paying taxes the owners were getting extra revenues at the expense of other sections of the country (usually the large land owners were benefited on this account and the low income people were the losers).

Another method which would be suggested by economic theory is the appraisal according to the productivity of the

land. This method is difficult to apply on the sierra haciendas because there are not records of production for a period of years. In order to make it reasonable we could find out the value of the product at the time of the redistribution and appraise the property from these data. The inconveniencies of this method are that a farmer would try to cultivate his farm as best as possible the year he thinks his farm is going to be redistributed. Another inconvenience might be that during the year of redistribution the weather would not be normal and would cause abnormal crops. If this method is used, it is important not to include the value productivity of labor within the appraised value of the land.

Another method of appraisal of the land is through the market value. However, present value of land may be higher than its productivity because of capitalization of labor and land; the security of the investment justified by the lack of many alternatives for investment in the Peruvian economy; the social status of the owners of the farm, which is normally higher. It may be advisable to combine the above suggested methods to attain a just price.

4. System of transferences and titles

It is suggested that land could be transferred to the laborers who live on a given farm. It will also be necessary that the owners who belonged to a redistributed farm should

be socially well balanced and could adjust to living in new society like the one which will be formed. However, it is more important to see if they will work for the development of the nation and for increasing their income. It would be ideal if the new titles were registered and singled out on a cadastral system of maps and records.

The Agrarian Reform Institute needs a legal section where titles would be recorded. If necessary, the Ministry of Justice could also adjust operations to solve the different types of problems presented by the transfers. It may be important to wait some time before formalizing the ownership title of land in order to determine whether the new owner has fulfilled the national goals with respect to the agricultural productivity. Later on, after a trial period, the titles would be formalized. It is important, however, that the new farmers have all the rights of ownership in order for credit to be available to them.

5. System of payment

It will be necessary to determine how the new owner will proceed in paying for his farm. Payment would be made with part of the farm income. This means that payment would be related to the crops and to the levels of living. To avoid complication and legal problems between the new owners and the old owners of the big farm, it is suggested that payment

could be made to the Agrarian Reform Institute. The Agrarian Reform Institute would in turn pay the old owner. It might be possible to set up a period of twenty years as the maximum payment period. If any new owner would like to pay faster he would be encouraged to do so.

6. Individual rights

Property rights may be restricted; if a new owner does not work the land efficiently and does not meet the requirements set up for him, his land would be expropriated by the Institute of Agrarian Reform. It could be given to a new farmer who has increased his productivity and needs some extra land for farming. The Indians (the new owners) should be tested for a given period in order to decide if they are working efficiently or not. However, the trial period could be fairly long.

Together with the rights of property, the new owner would be given the right to have a permit of water use. It is presently legislated that water is from the state and governmentally distributed. The new owner could ask for a permit of water use. If there is a water shortage, this permit would be regulated. Allocation of water could be made efficiently by the public institution responsible for its distribution.

B. Constitution of the Communities

We will outline here the characteristics and possibilities of the creation of communities. The community idea has been advanced in order to improve some of the inefficiencies found in the present system of farming and also as a guide to follow when the farms are rearranged after affectation by Agrarian Reforms. It could be regarded as a kind of indigenous community either recognized or not recognized. However, it is different in this sense that each farmer is owner of the plot he is farming. The hypothesis is advanced that the ownership of land would give them incentives to increase productivity. The community with a government formed by a council could represent a more democratic ideal than a government by a leader. An example of a community could be Vicos even though some of the lands are farmed in common by all the Indians living there.

The community's characteristics will be studied first by estimating its size, then its constitution and its functions. Stages and steps in the creation of the communities follow.

1. Size of the community unit

The territorial area exploited within a community unit will be so constituted and ordered as to contain all the resources necessary for the group's existence. How large

should this group be? The economic considerations outlined previously, accompanied by a study on population, religious life, psychological environment and social organization, will help to determine the size of the units.

As the size of the social aggregate increases, the behavior of its members changes. There is little precise knowledge of the relation between size of population and organization; yet the size of population is doubtlessly one of the most important limiting factors in man's collective life.

In an attempt to explain the connection that exists in a community unit between social structure, size of population and land parcelled out, some characteristics have been studied objectively.

The first is density of population as corrected by the notion of dispersion of the settlement. The distribution of the population over the inhabited part of the community accords with the layout of the habitation area, though the two are not identical.

Albert Demangeon (10) has attempted to define the density of population by a coefficient K, this coefficient is obtained by applying the formula:

$$K = \frac{E \times N}{I}$$

in which:

E = population living in outlying parts

N = total number of outlying parts

T = total population

K will be less than one where the settlement is compact. As an alternative, it is also suggested that the universal index be the numerical relationship between the population actively engaged in agriculture and the land area in the community. Each of these indices offers different advantages, which are not incompatible. The first is mainly useful in basic research and the second in applied economic research.

Apart from social factors and economic factors (quantity of available resources, ratio between the number of producers and consumers), a certain minimum number of people is essential to assure the survival of the group. This has been called the "population minimum" (a number of people necessary and sufficient for the biological maintenance of the group). He has observed that if the population has less than a certain number of members (although its composition by age and by sex is determined by natural laws), it cannot constitute a stable and self-sufficient community. The balance between the sexes for the fertile age group over a period of time, conditions the biological survival of the community.

Communities and population situation have a direct relationship. Their functional specialization, numerical strength of population, sex, ration, mobility, marriage, and birth rates.

Social and economic life is always accompanied by corresponding religious, mythical or magical expressions. The religious and mythical cosmos results in ritual and mythical institutions and expression which often coincide with the limits of its population and territory.

The "parish" is perhaps the most characteristic example of the religious institutions which helps to define the limits of the community unit and the ties by which its people are bound. The local church and its agent, the priest, for example, have a highly important social, political and even economic part to play in the community life. Religious rites and secular ceremonies and celebrations often accompany the various manifestations of collective life and, in particular, collective work. These ceremonial expressions offer essential opportunities for the enjoyment of leisure. Communion, for religious, recreational and alimentary purposes plays a major part in the affirmation of the community psychology. Religion encourages morality and coordination among community members.

Psychologically the rural community provides for each of its members a stable field in which choice and acquaintance are usually limited. A person generally knows every other person living within the unit. The community forms a group characterized by mutual acquaintance. Each person is linked to each other person by a bilateral relationship of immediate acquaintance based on personal experience. He is the center

of a system of mutual acquaintance. He knows of the existence of each of these individuals and is aware of being known, in the same way by all others.

Being a specific field of sociability, the rural community may also be considered as a cultural system made up of collective habits, forms of supervision, values, kinds of knowledge distributed by age groups, sex, family grade, etc.

It forms a fairly coherent and continuous terrain of behavior -- the individual fills all these social roles, professional, family, political, ritual, etc., in the same stable group. Everyone knows him in all his roles, interpersonal relations are based on simultaneous knowledge of each person's attributes, both individual and deriving from his status (or category).

We have to keep in mind the significance of such factors as the continuity of the sociological field; the conditions of apprenticeship and the early access of children to adult tasks and the adult system of values; and lastly, the frequent awareness of belonging to a separate community, distinct from "outsiders".

2. Constitution of the community unit

The community unit could be organized as a cooperative and government at the same time. The main difference from a cooperative is that this community unit would not have open

membership. The membership is to be formed by all the people living at the community unit.

Suggested here is the organization of communal autnority in the form of a council and a manager, elected by secret ballot by the members of the administrative community concerned.

The manager of the community would be one of the farmers living within this unit. He should be elected in a democratic way. The electors are all the members of the unit. The elections would be compulsory. However, this may be difficult at the beginning because most Indians cannot read or write.

A community council can carry out a number of functions. It may decide on the village's work and economy, bear witness and give judgment, appoint 'officials' to whom it may delegate its authority in part or in whole for a specific period. Usually the assembly consists not of all the individual members of the community, but only of heads of families.

The manager and the council will be in contact with the various sections of the Agrarian Reform Institute at low levels of aggregation. What we want here is to create a community organization which does not now exist in Peru. Usually, if there is an organization of the Indians within the farm it has descended from the Inca Empire and reformed during the first days of the Spanish conquest. The Spanish tried to use the same organization as the Indians had but with Spanish leaders. This is also true on many farms in

the Sierra where the political authorities are named by the owner of the farm and not by the Indians. The Indians, therefore, have to learn to elect their representatives and to use their authority within the community unit.

There are many types of Indian organizations within the hacienda system at present and the various community units may have their organization according to what people want.

3. Functions of the community

There are many important tasks that the community government could perform in order to fulfill its purposes. We will mention among them the following: a) education and improvement of productivity through community or collective work, b) cooperative associations like cooperative commodity marketing associations, c) cooperative sales associations, and d) saving and credit unions.

a. Education and improvement of productivity through community or collective work The main task of the community unit is to supplement and to improve the work of the owner-operators. Absorption of the redundant labor will be very important and could be accomplished by a communal work like the construction of a school for children of the community. This construction would be done by the Indians themselves, living in the community unit during the time they do not work at the farm. When these Indians are not busy

with the main agricultural work they are idle because of the lack of work within the region. The community can use the Indians all the time with the first purpose of building this school.

One study elaborates a model of a school for a geographic unit like the one we are describing (16). The study is the application of the architectural techniques to the Indian conditions in such a way this school can be built without much help from engineers or architects. The school will not need to use, at least in the first years of operation, well-trained teachers to start the job of training Indian children. They will need as teachers only people with first primary education, because this system uses a radio and, if possible, television channels, for teaching Indians. The best teachers and best method could be prepared at the station which brings the programs to the air. Radio transmission stations cover the sierra region.

Indians are willing to work together in order to build schools at a small wage. In a farm of the sierra, for example, the owner proposed to provide them a teacher if they built a school without being paid wages. They agreed to do so and they were very willing to start the job.

Foreign aid could be sought in the form of transistor radio receivers to be provided in the various geographic units formed. This type of assistance would be very productive in the long run and Peruvians might appreciate it more than they

would military aid. The transistor radios could be given as a grant to Peru to show the willingness and sincerity of more developed nations to improve productivity, standards of living and welfare of the Peruvian population.

When the school is set up within the community, the second main task of the community would be to start other forms of SOC activities through collective jobs at their spare time (almost one-half of the year). The work of clearing, irrigating, changing the configuration of the ground, fencing to protect the cultivated field from cattle, and laying out of roads is beyond their technical potentialities. That is why work is so often organized on a collective basis. The community as such, or its specialized sub units, would then clear the land, decide on the division of the communal territory into zones to be cultivated or grazed alternatively, organize irrigation and road building, etc. Group organization of work would be intended to meet the provision of technical efforts beyond the possibilities of the individual and the simultaneous pursuit of activities with technical requirements running counter to one another. This is important because many times a community is completely outside of civilization, because of the geographic characteristics especially the big canyons, rivers and mountains.

The Indians are also willing to work for themselves and for their community if they are helped by the government.

Another help the Institute of Agrarian Reform could provide are tools for working on community projects. It could also provide food at very low levels of payment because it could be obtained through P.L. 480 U.S. The provision of tools mentioned above would create at fast rates a good structure of rural highways within the country and would also improve the marketing efficiency, productive efficiency and industrialization within the country. One of the most important contributions of the community unit would be this kind of activity because communally and with the interest of improving their situation the Indians could work for themselves very efficiently.

In this way the Indians associated in the community unit would not be redundant laborers any more; they would start working on other activities than agriculture; this would improve their economic efficiency and could help to solve the problem of lack of skill for jobs other than agriculture. Some of these workers would eventually leave agriculture and work on presumably more productive jobs.

Systematic action for the improvement and development of units would make desirable the creation of pilot communities to be model communities. The pilot community would serve as a center for modernization, collective action, dissemination of ideas. It would be part of a wider economic zone that will constitute a support and a pattern for action.

For the purpose of putting new life into the community

and making it a hub of economic development, focal centers would have to be organized for action, education and planning.

A theoretical distribution of those centers and their zones of influence worked out by Walter Christaller (9) suggest a schematic organization of centers, communities and towns for a region (Figure 15).

In every case a preliminary study would be necessary for the purpose of diagnosing the problems and assessing the needs which moderate intervention.

This study might be carried out exclusively by social scientists, but the active cooperation of the community members in making diagnosis would be highly desirable.

A systematic policy of training research staff and leaders at the local level would be the necessary complement of such measures.

Cooperative associations could be formed through the manager of the community. He would be in contact with the technical help of the Institute of Agrarian Reform and he would receive not only advice but supervised credit at cheaper rates. At present the Banco Agropecuario del Peru is trying a new method of application for and granting of credit to groups of farmers. This same method could be applied to the group of people of the geographic unit. It would be easier for the bank to find an organization already set up. The Banco or the extension service would be related with the Institute. These services would advise the management of

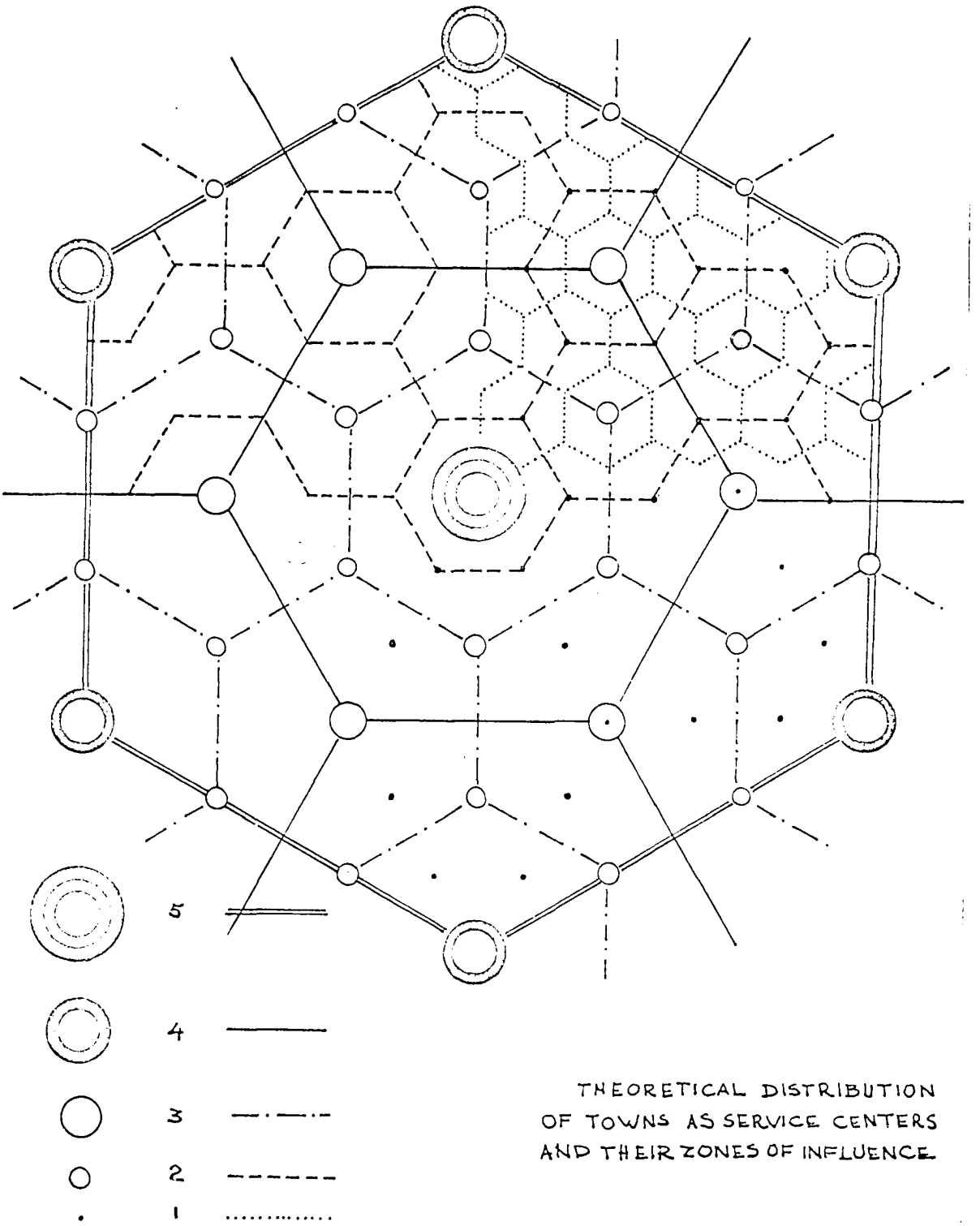

Figure 15. Various cathegories of towns as service centers

the community unit not only on the farm but also on creating marketing cooperative, purchasing cooperative and credit unions in a cooperative way.

b. Cooperative commodity marketing association

Another job of the community unit would be the creation of a kind of cooperative for purchase of machinery, seeds and fertilizers. A boot about cooperatives states that the specific principles for the purchasing cooperatives are the following (1):

1. Open membership
2. Democratic control
3. Dividend on purchase
4. Limited interest on capital
5. Political and religious neutrality
6. Cash training
7. Promotion of education

This list has been made from a century of cooperative experience. It is important to follow it if we want to form a good cooperative purchasing association. Of course, on this case, membership is not open, but in a sense is enforced until the Indians have attained a level of efficiency, productivity and knowledge that permits them to remain away from the community unit.

This marketing association could be part of a bigger association created by the Institute of Agrarian Reform for a regional level.

c. Cooperative sales association The principles of this cooperative are the following as suggested by Bakken

and Schaar (1):

1. Membership selection
2. Function and commodity specialization
3. Democratic representation
4. Services at cost
5. Savings prorated to members on a patronage basis
6. No unusual risk assumption
7. Attitude of non-partitionship and nonsectarianism
8. Dissemination of information to membership
9. Control of ownership of marketing facilities and institutions

These cooperatives would be associated with other community units at the regional level. The association would be accomplished through the management of the community.

d. Saving and credit union It has been found that Indians have a considerable amount of hoarded money. They need to be encouraged to save more and to use the savings for development. For capital formation it is important to save large amounts as well as the surpluses coming from the absorption of the redundant laborers by the industrial sector. This could be done in two ways: by saving and credit associations which would force Indians or owners to save part of their income, or through the marketing and the sales association, where they can save some of their income and invest it in better activities. The communal type jobs are also considered savings and investments for capital creation.

4. Creation of the community units

These community units would be created at the same time as the reform is put into effect. If some haciendas are redistributed, they would be organized into community units. Farms would be bought by owner-operators and they would be advised to organize the community units, giving them the rules for the election of the government and any other jobs at this level.

The size of the communities might change with time because of an increase of productivity of operators. This would be due to the increase in the size of the individual farm and to the size of SOC which conditions the possibility of uniting separated units by roads, highways and canals. It might happen that after it has been decided to bring a canal to a given land, two community units would join and become one bigger unit. The unit of purpose of the people to utilize the water in the canal in a better way without problems would influence them to form only one community.

VI. SUMMARY AND RECOMMENDATIONS

A model was developed to study the relationships linking various economic variables and structural arrangements within sierra haciendas. The model was developed at both farm and community levels. The interrelationship among the two levels of policy-making was approached assuming the operator is the policy maker at the farm level. The operators are grouped into communities formed by farm units interrelated in such a way within the hacienda that they can participate in the economic activities and legal relationships of each farm and household. The policy maker at the community level is the person or group with power to design and carry out policies affecting the community.

Using the framework set up by the model, a study was made of two sierra haciendas; one of them the Cuzco hacienda is a highly productive and mechanized farm; and the other the Ayacucho hacienda presents a tenure structure associated with a primitive agricultural system and low levels of productivity. Both farms have in common the existence of a resident labor force where laborers are essentially the dependents of the owner. The rented lands cultivated by Indians for themselves is considered farm level, and the owner's land, cultivated by the Indians as laborers, constitutes the community level.

The analysis of the rented lands on the Cuzco hacienda

showed among other things that fifty percent of the laborers cultivated land for themselves. The average amount of land per laborer was 0.530 hectares, varying from 0.136 to 0.702 hectare. Computed salaries to the several labor groups averaged S/. 8.50 for the core hacienda renters, S/. 6.07 for the owner and S/. 7.51 for the outside laborers per day of work. Another conclusion includes the effect or increase of capital resources owned by the Indian is that 2.82 percent of the income of laborers if the S/. 1,000.00 to S/. 2,000.00 income bracket is due to their capital resources. On the other hand, 79.30 percent of the income of laborers belonging to the S/. 10,000.00 or over income bracket is due to capital resources. The tenure system through advanced lending in amounts larger than their monthly salary is hypothesized to be responsible for the small plots cultivated by the laborers and the low level of technique and intensity. Under these conditions, determinant of income per capita is found to be the number of dependents.

The Cuzco hacienda as a whole (community level) shows a dichotomy with respect to the rented and owner's lands which is evident with respect to yields (862 kilos per hectare for corn at the rented lands as against 6,000 kilos per hectare at the owner's land and 1,300 kilos per hectare for wheat at the rented lands as against 7,700 kilos per hectare at the owner's farm); the owner borrows money from the Agricultural Bank but the Indians do not; the Indians

total net income is an average S/. 4,947.04 while the owner's total net income is S/. 1,536,630.34. Besides this dichotomy we also find a conflict between the owner and the laborers about the productivity of work and salary. It shows, at least in this farm, that the organization of communities and the investment within the same community would contribute to its development.

The Ayacucho hacienda uses less efficient technology and the conflicts of interest between the owner and Indians are more evident. The reason is hypothesized to be the unwillingness of the Indian to work harder on the owner's land because he feels he is paid below his productivity. On the other hand, the owner does not want to rent good land to the Indians because he feels that the association of interest of Indians and owners might be the main obstacle to the improvement in productivity together with lack of irrigation, physical characteristics of land, lack of capital, lack of SOC, and absenteeism of the owner.

Some remedial hypotheses are introduced for improvement of the situation looking at the hypothetical failure and success elements each may present. The main hypotheses introduced are (1) the creation of a single tenancy system where laborers could rent the owner's land, (2) the creation of family farms owner-operated, (3) government owned lands leased to the operators for them to work on, and (4) a system which combines the above stated hypotheses. It is

concluded that the fourth system emphasizing owned land but strong intervention, control and advice from a local and national government, together with a system of local and regional government organized as cooperatives might be the most desirable system.

The model and the two hacienda cases studied provide a basis for advancing some suggestions for reform at farm and community levels.

According to this reform of the hacienda, type of holding could emphasize the formation of communities and individual cultivators in order to provide the incentives of the ownership of land and to create a climate of development through group activity. In this system the individual would be given a plot of land but some limits of efficiency could be set up. If he is below the limit for some years then land could be bought by the community and redistributed among efficient workers. The community would also perform some activities to create job opportunities for unemployed people of the community and at the same time perform SOC outlays in order to improve the productivity of existing resources by building canals, leveling lands, building highways to the community, etc. Other policy-making units would help the individual farmers through the community which would also perform cooperative activities in association to some regional and national cooperatives. This would increase farmer's capital and improve farmer's income.

At the farm level, a priority system for starting reform, the design of a cadastral survey to be used for land rating, title registration, tax collection were suggested thus avoiding conflicts. Appraisal of land resources were reviewed and system of transferences, payment and individual rights were examined.

At the community level methods of estimating sizes of communities were reviewed through study of territorial area, social aggregate, demographic phenomena, religious and psychological necessities of a group of people and management problems. With respect to the Indians' problems, the constitution of communities was examined according to its functions, organization, relations to the non-farm communities and types of Indian organization. The main functions of a community were hypothesized to be the education and improvement in productivity through community or collective work, cooperative commodity marketing associations, cooperative sales associations and savings and credit unions. The creation of community units other than the hacienda type was also examined.

Experience obtained during this study and the findings suggest the following recommendations for further studies:

1) Much more research is required from the economic social, political, cultural, administrative, and technological points of view, to identify and characterize strategies for development. One of the major difficulties

experienced in the present study was the shortage of data and literature. This provides a challenge for universities, governmental agencies, and private institutions to generate relevant facts and ideas through well planned research studies. Training research scientists for full-time research and teaching jobs is a concommitant correlative. The hypothesis is herein advanced that if Peru expands its SOC outlays, particularly for educations and research, the developmental policies could be formulated and applied with greater prospects of successful consequences.

2) Short run and long run studies are needed to provide the basis for immediately correcting the most obvious deficiencies in the developing process and policies to accelerate development in the future which would mainly correct the deficiencies the immediate action policies may bring due to the lack of information. The new Peruvian government is engaged in an effort to make changes and some actions may well be taken without strong analytical studies because of the strong needs for immediate action. Therefore, it becomes important to design very flexible short run programs without definite commitments in order to allow researchers to study from an ex-ante point of view and also from an ex-post framework the results of the short run policies in relation to long run objectives.

3) Studies at the farm level are suggested for the various regions of the country. The model with the exogenous

variables used in the present study provide strong basis for developing quantitative means to study structures and institutions. An input-output coefficient could be estimated for each exogenous variable to estimate its influence on production which could be useful in the design of linear programming analysis estimation of structures and institutions.

4) Technological research studies would give economists better base for estimating optimum size of farms, future productivity of improvements and possible systems of cultivation.

5) Research at the community level from the economic and organizational point of view is needed. This would deal with savings through community credit unions, investment on social overhead capital and small transformation industries. The disguised unemployment problem could be partly solved through decentralization and action of the communities. Transformation of Indian communities to other types of more efficient groups and calculations of the optimum size of communities for a faster development are needed.

6) In order to complement the model, research is suggested on the area of utility and needs of people. The lexicographic ordering analysis may contribute to a better conceptualization of future demands and the impact of some policies on the people in relation to stability and their

preference function.

7) The model at the community level stresses the problem of the shortage and surplus of labor when this factor is differentiated into labor A and labor B according to demand's training requirements. The study could not be made at this level unless reliable coefficients are estimated for the development of meaningful input-output analysis. Research is needed in the areas of data collection, census taking and estimation.

8) Special emphasis should be given to the evaluation of resources and to the estimation of indexes of production in order to determine resource productivities in a given region and the character of farms for settlement and resettlement purposes.

9) Specific research could be developed on the area of education using radio and television to rapidly increase the literacy levels. The hypothesis that education may be one of the main blocks to development could be further tested and methods to improve these conditions developed.

10) Research is also needed in the area of public administration developing modern techniques and especially giving responsibilities to the individuals.

11) Resource valuation differentiating labor and land is one of the most important phases of a reform. The present study has dealt with this problem in some detail through the study of two sierra farms; however, it is important to do

more research, developing means to differentiate labor productivity and land productivity for purposes of due reward to resources.

12) The final recommendation is for encouraging research on the organization and functions of IRAC to meet the challenge of a giant job to be done for the improvement of the conditions of Peruvians.

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A P P E N D I X

Table 1. Price index and percentage increase per year[a]

	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961
Price index	100.0	117.34	123.77	125.29	138.23	148.53	160.41	168.31	180.94	218.10	246.09	255.03
Percentage increase per year	-.-	17.34	5.48	1.23	10.33	7.45	8.00	4.92	7.50	20.54	12.83	3.63

[a] Computed from Peru. Ministerio de Hacienda y Comercio (30).

Table 2. Gross national product, total disposable goods and services, and their interrelationships with public and private consumption and public and private investment[a]

Years	Total disposable goods and services	Gross national product	Profits or losses of current trans-actions	Total consump-tion	Private consump-tion	Public consump-tion
	(Million soles in constant 1950 prices)					
1950	15,203.8	15,148.3	55.5	12,108.2	10,815	1,293
1951	16,417.2	15,974.7	442.5	12,079.5	10,922	1,158
1952	17,611.4	17,016.7	594.7	13,105.5	11,760	1,346
1953	18,991.3	18,117.3	874.0	14,486.0	12,936	1,550
1954	17,788.7	17,626.4	162.3	13,660.7	12,088	1,573
1955	19,747.2	19,257.7	489.5	14,597.0	13,041	1,556
1956	21,039.0	19,115.7	1,123.3	15,544.5	13,368	2,177
1957	21,690.4	20,077.8	1,612.6	15,752.1	13,640	2,112
1958	21,838.6	20,463.3	1,375.3	16,526.7	14,144	2,383
1959	19,775.0	19,391.0	384.0	16,204.0	13,897	2,307
1960	20,505.0	20,848.0	343.0	16,158.0	13,492	2,666
1961	21,874.0	21,890.0	16.0	16,974.0	14,196	2,778

[a]Computed from Banco Central de Reserva del Peru (4,5).

Table 2 (continued).

Years	Percentage consumption is from total disposable goods and services	Percentage investment is from total disposable goods and services	Total gross investment	Private investment	Public investment	Percentage private investment is of total gross investment	Percentage public investment is of total gross investment
			(Million soles in constant 1950 prices)				
1950	79.6	20.4	3,096	2,764	332	89.3	10.7
1951	73.6	26.4	4,337	3,737	600	86.2	13.8
1952	74.4	25.6	4,505	3,731	774	82.8	17.2
1953	76.3	23.7	4,506	3,640	866	80.8	19.2
1954	76.8	23.2	4,128	3,508	620	85.0	15.0
1955	73.9	26.1	5,150	3,960	1,190	76.9	23.1
1956	73.9	26.1	5,494	4,472	1,022	81.4	18.6
1957	72.6	27.4	5,938	4,903	1,035	82.6	17.4
1958	75.7	24.3	5,312	4,502	810	84.8	15.2
1959	81.9	18.1	3,571	3,136	435	87.8	12.2
1960	78.8	21.2	4,347	3,958	389	91.1	8.9
1961	77.6	22.4	4,900	4,309	591	87.9	12.1

Table 2 (continued).

Years	Percentage private consumption is of total consumption	Percentage public consumption is of total consumption	Private sector in disposable goods and services	Public sector in disposable goods and services	Percentage private sector	Percentage public sector
	(Million soles in constant 1950 prices)					
1950	89.31	10.7	13,579	1,625	89.3	10.7
1951	85.40	14.6	14,659	1,758	89.3	10.7
1952	90.0	10.0	15,491	2,120	88.0	12.0
1953	89.3	10.7	16,576	2,416	87.3	11.7
1954	88.5	11.5	15,596	2,193	87.7	12.3
1955	89.3	10.7	17,001	2,746	86.1	13.9
1956	86.0	14.0	17,840	3,199	84.8	15.2
1957	86.6	13.4	18,543	3,147	85.5	14.5
1958	85.6	14.4	18,646	3,193	85.4	14.6
1959	85.8	14.2	17,033	2,742	86.1	13.9
1960	83.5	16.5	17,839	3,055	87.0	13.0
1961	83.6	16.4	19,096	3,369	87.3	12.7

Table 3. Gross national product by sectors 1950[a]

Sectors	Total GNP 1950 prices (million soles)	Percentage of total GNP	Rank of total GNP	Per capital GNP 1950 prices (Soles)	Rank per capital
Agriculture and livestock	5,627	37.2	1st	2,944	7th
Mining	1,635	10.8	4th	29,504	2nd
Total primary industries	7,262	48.0	-	-	-
Industry service	2,199	14.5	3rd	4,095	6th
Service	817	5.4	6th	7,886	5th
Commerce	2,472	16.3	2nd	18,349	3rd
Finances	254	1.7	8th	34,066	1st
Other	519	3.4	7th	2,553	8th
Government	1,625	10.7	5th	14,909	4th
Grand total	15,148	100.00	-	-	-
Average	-	-	-	4,984	-

[a] Banco Central de Reserva del Peru (4).

Table 4. Censused population of the Republic of Peru and four selected Departamentos[a]

Population by races	Absolute fig. total Republic	Relative figures				
		Total	Puno	Cusco	Ayacucho	Lima
White and mestiza	3,283,360	52.89	7.51	28.15	23.84	79.49
Indian	2,847,196	45.86	92.36	71.73	75.94	15.30
Negroes	29,054	0.47	0.01	0.04	0.02	1.66
Yellow	41,945	0.68	0.05	0.04	0.04	3.46
Non Declared	6,412	0.10	0.07	0.04	0.16	0.09
Totals	6,207,967	100.00	100.00	100.00	100.00	100.00

[a] Calculated from Peru. Ministerio da Nacienda y Comercio (29, p.148).

Table 5. Number and size of haciendas in the district and their products[a]

Farms	Size (Hectares)	Products[b]							
		Sugar Cane	Barley	Potatoes	Corn	Others	Livestock	Alfalfa	Fruit
1	3,000	+	+		+	+	+		
2	2,000	+	+		+	+	+		
3	1,000	+	+		+	+	+		
4	2,000		+		+	+			
5	1,000		+	+	+	+		+	+
6	500		+		+	+			
7	3,200	+	+	+	+	+	+	+	+
8	400		+		+	+	+		
9	1,500		+	+	+	+			
10	1,000		+	+	+	+			
11	150			+			+		
12	500			+			+		
13	200		+	+	+	+	+		
14	200				+		+		
15	1,500	+	+	+	+	+	+		
16	2,050	+	+	+	+	+	+		
Total	20,200	6	13	9	14	13	11	2	2

[a]Data obtained from the Concejo Municipal of the Products[b] capital of the district where the farm is located.

[b]Products market (+) are cultivated on the farm commercially.

Table 6. Amount and distribution of total gross income and its components for the Cuzco hacienda and annex[a].

Distribution of gross income per 13 month period (Soles)	Number of Indian families (Soles)	Average total gross income (Soles)	Average total income from crops (Soles)	Average total income from personal property (Soles)
Core hacienda				
1,001 - 2,000	1	1,413.76	555.86	39.90
2,001 - 3,000	11	2,413.11	258.41	288.55
3,001 - 4,000	8	3,361.47	629.90	520.61
4,001 - 5,000	4	4,489.67	1,325.46	1,005.75
5,001 - 6,000	3	5,504.82	1,371.99	900.67
6,001 - 7,000	2	6,529.52	506.02	3,753.00
7,001 - 8,000	3	7,524.64	1,438.13	3,357.00
8,001 - 9,000	2	8,606.15	794.85	1,090.85
9,001 -10,000	1	9,556.98	2,554.98	210.00
over -10,001	3	12,377.47	2,073.80	4,314.33
Average	38	4,947.04	882.92	1,237.25
Annex				
1,001 - 2,000	-	-.-	-.-	-.-
2,001 - 3,000	1	2,499.00	-.-	1,374.00
3,001 - 4,000	1	3,323.72	1,604.30	648.00
4,001 - 5,000	-	-.-	-.-	-.-
5,001 - 6,000	1	5,971.74	1,341.24	3,430.00
6,001 - 7,000	2	6,596.34	785.99	4,827.85
7,001 - 8,000	2	7,690.03	2,728.78	3,100.00
8,001 - 9,000	1	8,390.92	3,660.62	3,566.30
9,001 -10,000	1	9,642.00	-.-	9,042.00
over -10,000	4	19,475.18	2,963.00	15,460.18
Average	13	10,483.26	1,960.59	7,365.90

[a]Calculated from individual records obtained directly from the hacienda.

Table 6 (continued).

Distribution of gross income per 13 month period (Soles)	Average total salary (Soles)	Percentage from total gross income: Total income from crops	Total income from personal property	Total salary
Core hacienda				
1,001 - 2,000	836.00	39.32	2.82	59.13
2,001 - 3,000	1,865.70	10.70	11.96	77.31
3,001 - 4,000	2,209.58	18.74	15.49	65.73
4,001 - 5,000	2,158.46	29.52	22.40	48.07
5,001 - 6,000	3,232.17	24.92	16.36	58.71
6,001 - 7,000	2,270.50	7.75	57.47	34.79
7,001 - 8,000	2,729.51	19.11	44.61	36.27
8,001 - 9,000	6,720.45	9.24	12.67	78.08
9,001 -10,000	6,792.00	26.73	2.20	71.06
over -10,001	5,989.33	16.75	34.85	48.38
Average	2,857.08	17.85	25.00	57.15
Annex				
1,001 - 2,000	-.-	-.-	-.-	-.-
2,001 - 3,000	1,125.00	-.-	54.98	45.02
3,001 - 4,000	1,071.42	48.26	19.50	32.23
4,001,- 5,000	-.-	-.-	-.-	-.-
5,001 - 6,000	1,200.50	22.45	57.43	20.10
6,001 - 7,000	985.50	11.91	73.18	14.94
7,001 - 8,000	1,861.25	35.48	40.31	24.20
8,001 - 9,000	1,164.00	43.62	42.50	13.87
9,001 -10,000	600.00	-.-	93.78	6.22
over -10,001	1,052.00	15.21	79.30	5.40
Average	1,158.65	18.70	70.25	11.05

Table 7. Crop production and income from crops by size of Indian farms, Cuzco hacienda[a]

Area of individual holdings	Number of Indian plots	Total area per holding	Corn			Wheat		
			Area	Production	Value	Area	Production	Value
(Hectares)		(Hectares)	(Hectares)	(Kilos)	(Soles)	(Hectares)	(Kilos)	(Soles)
Core hacienda								
0.000 - 0.200	1	0.136	0.136	59.88	143.58	-.-	-.-	-.-
0.201 - 0.400	16	0.279	0.279	198.32	475.45	-.-	-.-	-.-
0.401 - 0.600	4	0.486	0.384	381.87	916.43	0.102	80.53	175.82
0.601 - 0.800	1	0.678	0.542	957.20	2,297.28	0.136	128.85	257.70
0.801 - 1.000	2	0.813	0.271	226.88	544.50	0.542	515.42	1,030.84
over - 1.000	6	0.702	0.702	615.13	1,476.53	0.475	733.24	1,466.48
Average	30	0.530	0.381	328.74	788.73	0.149	196.04	394.05
Annex								
0.201 - 0.400	1	0.271	0.271	232.86	558.86	-.-	-.-	-.-
0.401 - 0.600	2	0.542	0.407	349.29	838.28	0.136	192.78	389.06
0.601 - 0.800	1	0.610	0.271	232.86	558.86	0.339	402.67	805.43
0.801 - 1.000	2	0.881	0.678	389.32	934.37	0.204	206.00	410.00
over - 1.000	5	1.304	0.649	608.01	1,459.56	0.655	791.24	1,580.01
Average	11	0.932	0.542	453.00	1,087.35	0.390	468.77	936.69

[a]Calculated from individual records obtained directly from the hacienda.

Table 7 (continued)

Area of individual holdings (Hectares)	Other crops value (Soles)	Total income from crops (Soles)	Total dependents (Number)	Total income from crops per capita (Soles)
Core hacienda				
0.000 - 0.200	0.0	143.58	2.00	71.79
0.201 - 0.400	-.-	573.53	2.68	207.35
0.401 - 0.600	-.-	1,092.25	4.25	615.61
0.601 - 0.800	-.-	2,554.98	7.00	365.00
0.801 - 1.000	-.-	1,163.00	4.50	255.20
over - 1.000	-.-	2,496.32	3.83	831.90
Average	-.-	1,118.27	3.36	390.62
Annex				
0.201 - 0.400	111.77	670.73	5.00	134.15
0.401 - 0.600	270.47	1,472.77	5.00	294.55
0.601 - 0.800	273.86	1,637.15	2.00	818.58
0.801 - 1.000	288.52	1,222.38	7.00	174.63
over - 1.000	564.47	3,561.50	5.00	712.30
Average	393.18	2,317.06	5.09	495.69

Table 8. Classification of Indian workers by salary[a]

Average salary per day of work (Soles)	Number of Laborers	Number of Months Worked	Average work per month per laborer (Days)	Average salary per day (Soles)	Average monthly total earned (Soles)	Average monthly total discounts (Soles)	Average monthly debts balance (Soles)	Average monthly advances in cash (Soles)
Core hacienda								
25 - over	1	13	28.5	25.51	726.96	830.98	216.68	430.22
20 - 24.99	-	-	-.-	-.-	-.-	-.-	-.-	-.-
15 - 19.99	2	26	30.79	16.84	518.26	1244.28	950.93	118.50
10 - 14.99	4	50	30.12	12.66	381.81	412.95	159.33	136.99
5 - 9.99	27	316	24.49	6.70	164.77	317.80	210.07	52.51
5 - 5.99	2	26	29.91	5.68	169.81	366.44	251.10	84.54
6 - 6.99	18	212	24.21	6.57	175.31	303.23	215.05	38.14
7 - 7.99	7	78	24.58	7.33	177.91	341.38	188.01	80.31
Annex								
5 - 9.99	11	77	26.02	6.00	155.78	45.41	0.58	37.66
5 - 5.99	1	8	27.19	5.75	156.43	4.50	-.-	2.00
6 - 6.99	10	69	25.88	6.02	155.72	49.50	0.64	41.22

[a]Calculated from individual records obtained directly from the farm.

Table 8 (continued).

Clothes per month (Soles)	Grains per month (Soles)	Meat per month (Soles)	Alcohol per month (Soles)	Average cash payments (Soles)	Average debts per month (Soles)	Miscellaneous per month (Soles)
Core hacienda						
31.15	23.85	12.96	59.80	93.22	216.21	56.14
-.-	-.-	-.-	-.-	-.-	-.-	-.-
41.31	3.54	31.94	25.85	199.00	925.63	78.73
21.15	9.24	8.36	16.62	104.88	139.65	48.15
24.34	1.61	9.82	3.12	40.89	224.64	43.14
3.35	6.93	0.91	0.21	1.85	346.12	15.58
27.63	1.52	11.15	3.89	41.79	228.36	47.96
21.90	0.34	8.95	1.97	29.36	200.73	38.62
Annex						
1.25	-.-	0.04	0.46	122.24	1.16	0.94
-.-	-.-	-.-	2.50	151.93	-.-	-.-
1.38	-.-	0.04	0.25	119.27	1.28	1.03

Table 9. Total gross income per capita by number of dependents per family[a].

Number of Dependents	Number of Indian families	Total gross income per capita (Soles)	Total gross income less salary per capita (Soles)	Total salary per capita (Soles)	Total gross income per capita: Total gross income less salary per capita (Percentage)	Total gross income per capita: Total salary per capita (Percentage)
Core hacienda						
1	4	2,972.47	1,100.01	1,872.46	37.01	62.99
2	10	2,028.00	817.62	1,212.08	40.30	59.74
3	11	1,601.30	903.12	698.18	56.40	43.60
4	5	1,534.82	794.92	739.90	51.79	48.21
5	2	1,052.91	34.50	1,019.41	3.27	96.72
6	3	905.39	344.17	561.22	38.01	61.99
7	1	1,365.28	395.00	970.29	28.93	71.07
8	2	1,027.88	300.47	727.42	29.23	70.77
Average	38	1,729.25	752.17	977.31	43.50	56.52
Annex						
1	-	-.-	-.-	-.-	-.-	-.-
2	3	4,490.52	3,696.82	794.40	82.32	17.69
3	2	3,813.59	3,630.26	183.34	95.19	4.81
4	-	-.-	-.-	-.-	-.-	-.-
5	3	1,621.90	1,406.90	215.00	86.74	13.26
6	1	1,102.04	901.54	200.50	81.81	18.19
7	1	1,198.70	1,032.42	166.29	86.13	13.87
8	3	1,974.39	1,824.03	150.33	92.38	7.61
Average	13	2,629.87	2,305.98	324.05	87.68	12.32

[a]Calculated from individual records obtained directly from the hacienda.

Table 10. Mortgage history of the Cuzco hacienda[a]

Date of mortgage	Amount borrowed (Soles)	Rate of interest per year (Percentage)	Source of borrowing	Kind of security	Loans (Order)	Date of total payment	First installment		
							Period (Year)	Amount returned (Soles)	Calculated interest (Soles)
1-26-1910	8,000.00	12	Money lender	Mortgage	1	12/18/1913			
7-26-1910	8,000.00	12	Money lender	Mortgage	2	12/5/1910			
12-20-1913	6,000.00	10	Money lender	Mortgage	3	10/21/1936			
4-9-1915	24,000.00	12	Money lender		4	9/3/1919			
12-26-1917	14,000.00	18	Money lender	Mortgage	5	9/2/1919			
6-2-1921	15,000.00	10-6	Money lender	Mortgage	6	10/2/1934	7	10,500.00	10,500.00
4-21-1928	10,000.00	6	Money lender	Mortgage	7	6/18/1936			
6-1-1934	78,002.00	10	Money lender	Mortgage	8	11/28/1936	1	39,001.50	7,800.20
10-21-1935	30,000.00	22	Money lender	Mortgage	9	12/26/1936			
1-21-1937	120,000.00	8½	Money bank	Mortgage	10	10/13/1960			
11-23-1940	20,000.00	10	Money lender	Mortgage	11	4/12/1943	1	10,000.00	2,000.00
11-20-1957	494,012.00	9	B.F.A.	Loan					

[a] Obtained from the office of Registros Publicos. Cuzco, Peru.

Table 10 (continued).

Date of mortgage	Second Installment			Total		
	Period (Years)	Amount returned (Soles)	Calculated interest (Soles)	Period (Year month)	Amount (Soles)	Interest (Soles)
1-26-1910				4-0	8,000.00	3,760.00
7-26-1910				1-0	8,000.00	960.00
12-20-1913				23-0	6,000.00	13,800.00
4-9-1915				4-5	24,000.00	12,720.00
12-26-1917				1-9	14,000.00	4,340.00
6-2-1921	6.0	4,500.00	1,620.00	13-0	15,000.00	12,120.00
4-21-1928				8-0	10,000.00	4,800.00
6-1-1934	1.5	39,001.30	10,940.00	2-5	78,002.00	18,740.00
10-21-1935				1-2	30,000.00	7,700.00
1-21-1937				23-10	120,000.00	44,200.00
11-23-1940	4.0	10,000.00	650.00	1-4	20,000.00	2,650.00
11-20-1957						

Table 11. Use of resources per hectare for each crop and allocation of total income; eighteen month period[a].

	1st Sugar cane period			2nd, 3rd & 4th Sugar cane periods		
	No.of Units	Cost per unit (Soles)	Total cost (Soles)	No.of units	Cost per unit (Soles)	Total cost (Soles)
Labor	612	9.00	5,508.00	612	9.00	5,508.00
Tractor	17	80.00	1,360.00	-	-.-	-.-
Seeds	207	0.54	1,125.00	-	-.-	-.-
Fertilizer	-	-.-	3,000.00	-	-.-	3,000.00
Land	1	3,306.49	3,306.49	1	3,306.49	3,306.49
Management[b]	1	15,700.51	15,700.51	1	18,185.51	18,185.51
Total cost or total income		-.-	30,000.00	-	-.-	30,000.00

[a]Obtained by calculating the records of individual crops at the owner's land, Cuzco hacienda.

[b]Obtained as a residual from total income (total income- other costs - management).

Table 11 (continued).

	Wheat			Corn		
	No. of Units	Cost per unit (Soles)	Total cost (Soles)	No. of units	Cost per unit (Soles)	Total cost (Soles)
Labor	165	9.00	1,485.00	175	9.00	1,575.00
Tractor	42	80.00	3,360.00	425	80.00	3,400.00
Seeds	720	2.00	1,440.00	250	2.50	625.00
Fertilizer	-	-.-	6,000.00	-	0.0	5,000.00
Land	1	3,306.49	3,306.49	1	2,390.71	2,390.71
Management	1	7,448.51	7,448.51	1	8,609.29	8,609.29
Total cost or total income	-	-.-	23,040.00	-	-.-	21,600.50

Table 12. Days of work and salary payment to laborers coming from Core hacienda, Annex, Apurimac and other places January, 1961 to January, 1962 (13 months)[a]

Workers' origin	Number of laborers		Days of work		Average salary		Total payment	
	Total	Average per month	Total	Average per month	Total	Average per month	Total	Average per month
					(Soles)		(Soles)	(Soles)
Male adult labor								
Core hacienda	680	52.30	17,164.50	1,320.34	8.56	-.-	146,989.75	11,306.90
Annex	304	23.00	7,129.50	548.45	6.09	-.-	43,462.75	3,343.28
Apurimac	239	18.38	4,924.00	378.76	6.61	-.-	32,565.00	2,507.00
Other places	388	29.84	5,136.00	395.07	7.51	-.-	38,587.25	2,968.25
Women and children								
Core hacienda	122	9.38	3,135.00	241.15	2.86	-.-	3,937.40	687.49
Annex	30	2.31	730.00	56.15	2.58	-.-	1,890.00	145.38
Apurimac	28	2.15	546.00	42.00	2.87	-.-	3,079.50	390.72
Grand total	1,887	145.15	40,450.00	3,111.54	6.89	-.-	279,082.65	21,467.89

[a]Calculated from individual records obtained directly from the hacienda.

Table 13. Average salary by origin of workers January, 1960 to January, 1961 (13 months)[a].

Workers' origin	Average salary (Soles)	Days of work	Payment (Soles)	Percentage from total payment
Male adults				
Core hacienda	8.50	17,164.50	146,989.75	56.00
Annex	6.09	7,129.50	43,462.75	16.60
Apurimac	6.61	4,924.00	32,565.00	12.40
Other places	7.51	5,136.00	38,587.25	14.70
Total	7.61	34,354.00	261,604.75	93.74
Women and children				
Core hacienda	2.85	3,135.00	8,937.40	51.14
Annex	2.58	730.00	1,890.00	10.81
Apurimac	2.87	546.00	1,571.00	8.99
Other places		1,685.00	5,079.50	29.06
Total	2.87	6,096.00	17,477.90	6.26
Totals				
Total in male adult units[b]	8.60	2,032.00	17,477.90	-.-
Grand total in adult units	7.67	36,386.00	279,082.65	100.00
Grand total adjusted to $1\frac{1}{2}$ years period	7.67	52,925.09	405,938.40	145.45
Grand total per hectare	7.67	386.31	2,963.05	-.-

[a]Calculated from individual records obtained directly from the hacienda.

[b]Obtained by converting women and children figures to the equivalent in male adult units.

Table 14. Economic analysis of the owner's net income from the Cuzco hacienda operation 1962[a]

Number	Items	Units
Variable costs		
1	Preparation of land, furrowing, seeding, etc.	Tractor hours
2	Seed	Kilos
3	Fertilizer: Guano de islas & urea	Kilos
4	Weeding (by hand)	Men hours
5	Cultivation ("aporque")	Tractor hours
6	Irrigation	Men hours
7	Sugar cane cutting and processing	Men Hours
8	Harvest	Men hours
9	Harvesting machine	Men hours
10	"Serquillo"	Men hours
11	Total variable costs	Soles
12	Total fixed costs	Soles
13	Total fixed and variable costs per hectare	Soles
14	Period of cultivation	Years
15	Adjusting coefficient to 1½	Years
16	Total variable costs	Soles
17	Total fixed cost	Soles
18	Total cost per 1½ year	Soles
19	Yield per Ha. adjusted to 1½ years	-
20	Unit	-
21	Price per unit	-
22	Total gross income (1½ years)	Soles
23	Total gross income less variable cost (1½ year period)	Soles
24	Total net income (1½ year period)	Soles
25	Number of hectares of cultivation	
26	Total net income for entire farm	Soles

[a]Calculated from detailed data of costs of operation per hectare per crop and other actual costs.

Table 14 (continued).

Number	First sugar cane period			2nd, 3rd, 4th Sugar cane period		
	No. of units	Value per unit (Soles)	Total value (Soles)	No. of units	Value per unit (Soles)	Total value (Soles)
Variable costs						
1	17	80.00	1,360.00	-	-.-	-.-
2	207	0.54	1,125.00	-	-.-	-.-
3	-	-.-	3,000.00	-	-.-	3,000.00
4	90	9.00	810.00	90	9.00	810.00
5	-	-.-	-.-	-	-.-	-.-
6	182	9.00	1,638.00	182	9.00	1,638.00
7	300	9.00	2,700.00	300	9.00	2,700.00
8	-	-.-	-.-	-	-.-	-.-
9	-	-.-	-.-	-	-.-	-.-
10	40	9.00	360.00	40	9.00	360.00
11			10,993.00			8,508.00
12			3,306.49			3,306.49
13			14,299.49			12,814.49
14	1½	-.-	-.-	1½	-.-	-.-
15	1	-.-	-.-	1	-.-	-.-
16	-	-.-	10,993.00	-	-.-	8,508.00
17	-	-.-	3,306.49	-	-.-	3,306.49
18	-	-.-	14,299.00	-	-.-	12,814.49
19	150	-.-	-.-	150	-.-	-.-
20	qq	-.-	-.-	qq	-.-	-.-
21	-	200.00	-.-	-	200.00	-.-
22	-	-.-	30,000.00	-	-.-	30,000.00
23	-	-.-	19,007.00	-	-.-	19,492.00
24	-	-.-	15,700.51	-	-.-	18,185.51
25	32	-.-	-.-	25	-.-	-.-
26	-	-.-	502,416.32	-	-.-	454,637.75

Table 14 (continued).

Number	Wheat			Corn		
	No.of units	Value per unit (Soles)	Total value (Soles)	No.of units	Value per unit (Soles)	Total value (Soles)
Variable costs						
1	14	80.00	1,120.00	15	80.00	1,200.00
2	240	2.00	480.00	100	2.50	250.00
3	-	-.-	2,000.00	-	-.-	2,000.00
4	20	9.00	180.00	20	9.00	180.00
5	-	-.-	-.-	2	80.00	160.00
6	-	-.-	-.-	-	-.-	-.-
7	-	-.-	-.-	-	-.-	-.-
8	35	9.00	315.00	50	9.00	450.00
9	-	-.-	100.00	-	-.-	-.-
10	-	-.-	-.-	-	-.-	-.-
11			4,195.00			4,240.00
12			1,102.16			956.28
13			5,297.16			5,196.28
14	0.5	-.-	-.-	0.6	-.-	-.-
15	0.3	-.-	-.-	2.5	-.-	-.-
16	-	-.-	12,285.00	-	-.-	10,600.00
17	-	-.-	3,306.49	-	-.-	2,390.71
18	-	-.-	15,591.49	-	-.-	12,990.71
19	11,520	-.-	-.-	9,000	-.-	-.-
20	kgs.	-.-	-.-	kgs.	-.-	-.-
21	-	2.00	-.-	-	2.40	-.-
22	-	-.-	23,040.00	-	-.-	21,600.00
23	-	-.-	10,455.00	-	-.-	11,000.00
24	-	-.-	7,448.51	-	-.-	8,609.29
25	54	-.-	-.-	110	-.-	-.-
26	-	-.-	402,219.54	-	-.-	947,021.90